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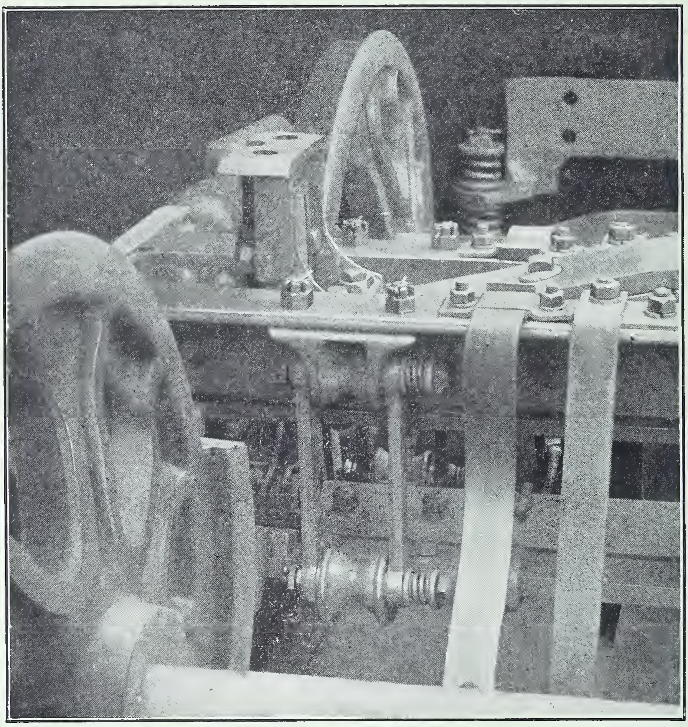
Vol. VI JANUARY, 1912 No. 1

BRILL MAGAZINE

Mariahilfer-Strasse
Vienna, Austria



BRILL HALF-BALL BRAKE HANGER

PATENTED

For more than three years this brake hanger has been used on all Brill trucks and not a single complaint has been received on its action and wearing qualities. It meets every requirement of a brake hanger, namely: it adjusts itself to compensate and, therefore, is noiseless; it has the requisite amount of side play under spring tension and is self cleaning. The Half-Ball Hanger gives complete satisfaction and reduces maintenance charges.

THE J. G. BRILL COMPANY

PHILADELPHIA - - - PENNSYLVANIA

H. E. Chubbuck

Vice-President Executive and General Manager
Illinois Traction System and the Western Railways & Light Co.

SUPPLEMENT TO BRILL MAGAZINE
JANUARY, 1912

BRILL MAGAZINE

Vol. VI JANUARY, 1912 No. 1

H. E. CHUBBUCK

[WITH PORTRAIT INSERT]

H. E. CHUBBUCK, Vice-President, Executive and General Manager of the Illinois Traction System and the Western Railways & Light Company, known as the McKinley properties, was born in Utica, N. Y. His grandfather was a pioneer in the electrical field, collaborated with Morse in the perfection of the telegraph, and was one of the first to experiment with electricity for traction purposes. Mr. Chubbuck's father was also an inventor, and originated the pony telegraph sounder and key, which is still in use, and his factory in Utica was the first in the United States to manufacture telegraph instruments. In 1882, after receiving his early electrical training with his father, Mr. Chubbuck went with the Thompson-Houston Company, of Providence, R. I., and installed the lighting systems of Pawtucket, R. I., Syracuse and Auburn, N. Y., and Springfield, Ohio. In 1884-5 he was electrical engineer for the Narragansett Company, Providence, R. I., after which he managed the electric lighting plant at Springfield, Ohio, which he had installed, and was next transferred to Omaha, Neb., where he reorganized the lighting system. During the panic of 1893 he was appointed receiver of the street car lines at Pueblo, Col., which he reorganized and made a paying property. In 1898, after 10 years in the selling and engineering organization of the General Electric Company, he went with the McKinley Syndicate to rebuild and manage the Quincy, Ill., properties, and now has complete charge of the McKinley properties, which include an electric railway trackage of 735 miles in the following cities, and the electric lighting, gas and steam heating properties in most of these cities: Jacksonville, Granite City, Madison, Venice, Decatur, Bloomington, Peoria, Champaign, Urbana, Danville, LaSalle, Peru, Princeton, Galesburg, Quincy, Cairo, Ottawa, in Illinois, and Atchison, Wichita and Topeka, in Kansas. Mr. Chubbuck is president of the Illinois Electric Railways Association.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

VIENNA, AUSTRIA*

VIENNA, the capital and metropolis of Austria, has a population of over 2,000,000 and covers 105½ square miles. It is situated on the western bank of the River Danube and has been for centuries the converging point of the great highways of traffic which lead from the level country over the Semmering Mountains on one side, and on the other follow the course of the river. The railway systems of the monarchy radiate in all directions from their termini at the city and connect the industrial sections with the great industrial and commercial center. As in other large cities, Vienna has increased its area by adding suburban districts, which have become populous either through the establishment of industrial enterprises or by improved transportation facilities, and at present there are 21 districts within the municipality. The older part of the city, known as the first district, lies in a circle cut off at one side by the Danube Canal, and is surrounded on all sides by the other districts. The streets run from the center radially to the outskirts and are crossed by streets surrounding the old part in concentric circles; the system of streets is fairly regular, although there is some deviation caused by the Danube Canal and the Danube River.

The street railway system commenced in 1865 with the introduction of horse-car lines and immediately relieved the overcrowded condition of the city by enabling the movement of a part of the population to the suburbs. The transportation facilities soon became inadequate, and the addition of steam tram lines, while alleviating the situation, still were unable to keep abreast with the expansion. The government

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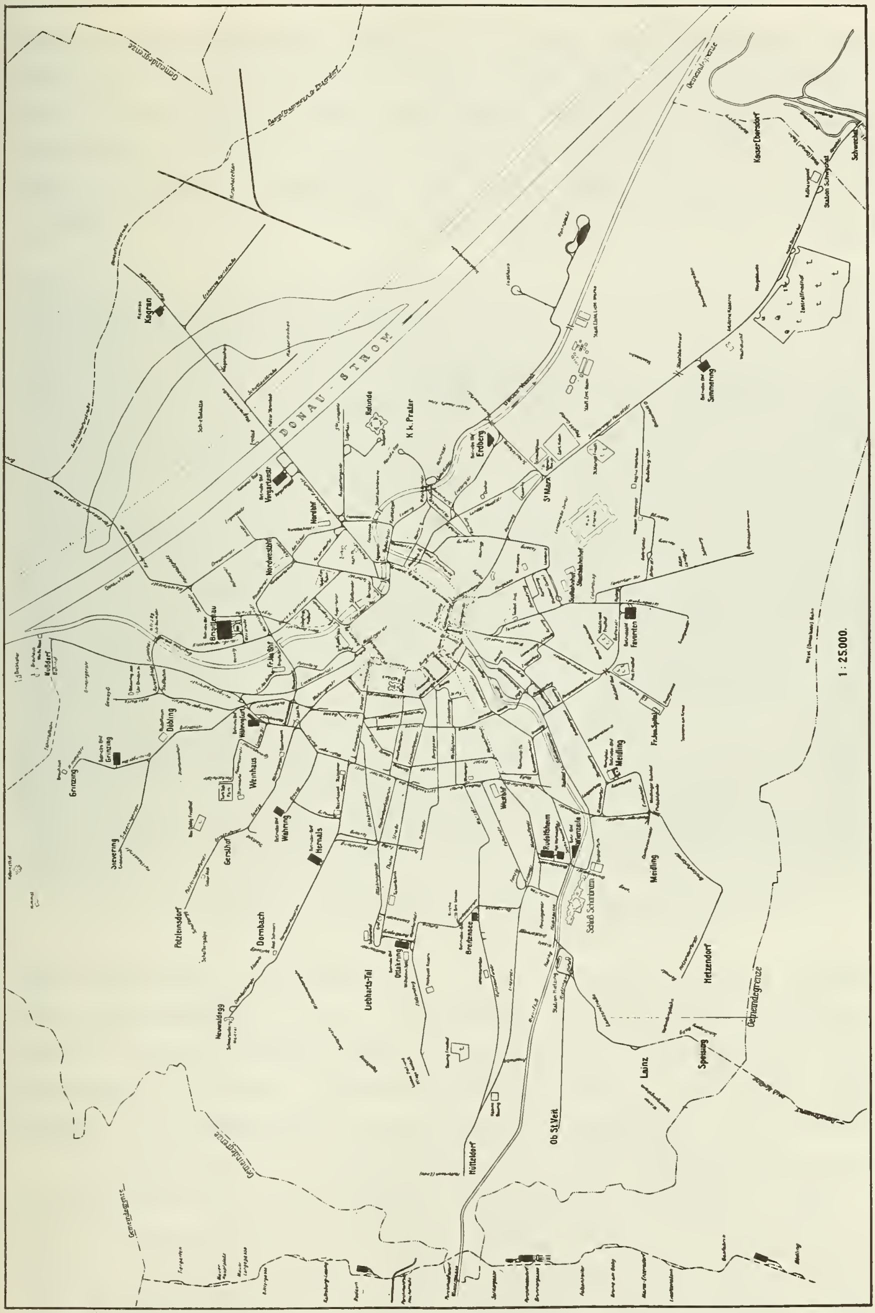
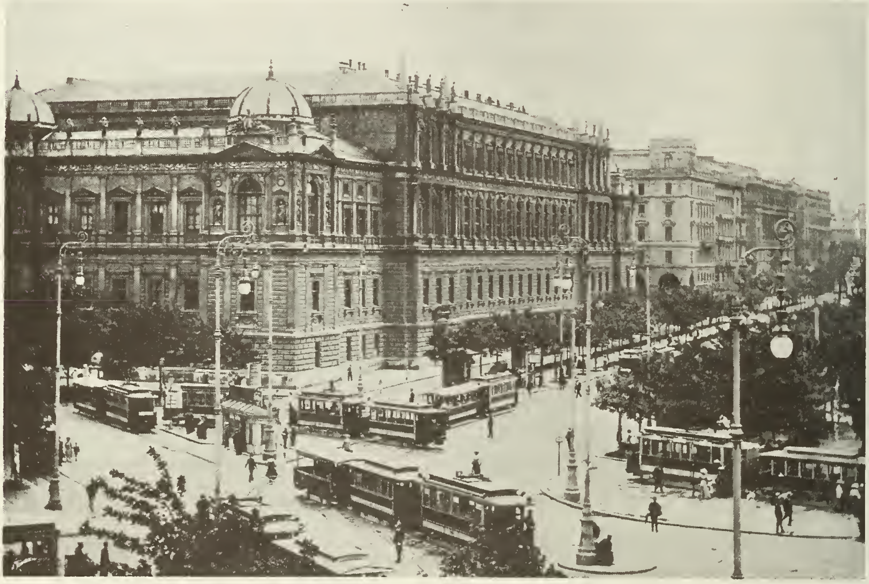
* The thirty-seventh article of this series.

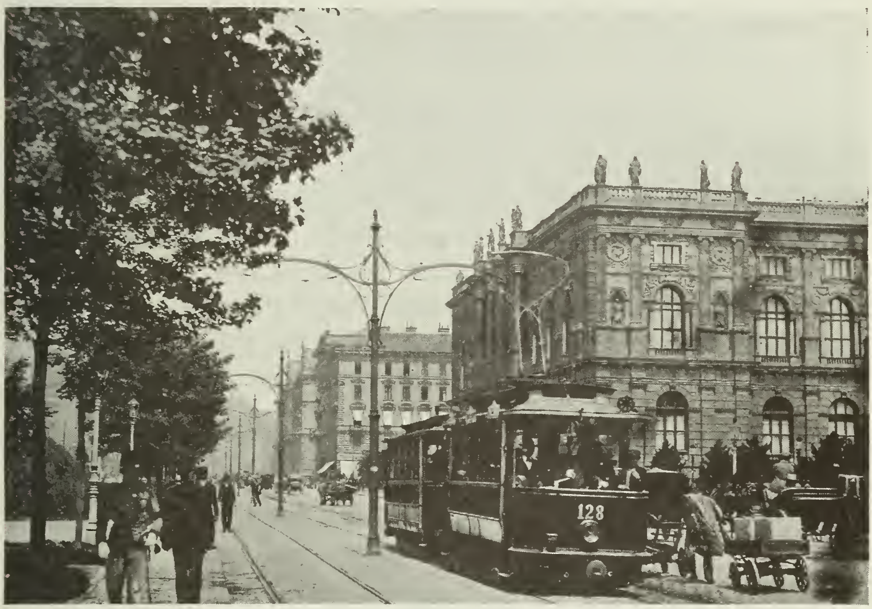


Map of the Vienna Municipal Tramways System. The lines radiate from a parked boulevard, known as the Ring-Strasse, which extends around the central part of the city had constructed a steam line, partly elevated and partly underground, of over 24⅞ miles (40 km.) in length, mainly for strategical purposes, which has been of little use to local traffic. Many obstacles prevented the complete electrification of the lines until 1903, when the municipality took over the system and has since borne the burden of the street railway traffic of the entire city area. The carefully prepared network of lines has been fully equal to the requirements, even up to the present population, but the ever-increasing expansion of the city is developing congestion at many points in the business sections, and a further construction of surface and underground lines in the near future is inevitable.



VIENNA MUNICIPAL TRAMWAYS. An important traffic point on the Ring-Strasse, showing the various types of cars operated singly and in trains. In the center of the photograph will be seen a waiting station, of which there are 107 at different points on the system. The large building is a part of the University

The trackage of the Vienna Municipal Street Tramways is somewhat over 153 miles in length, and is operated by electricity, with the exception of 19½ miles of lines on which steam dummies are employed. Except for 10 miles of conduit system, the cars receive the current from overhead conductors. Almost the entire system is made up of double-track lines, traversing the middle of the street, the distance between the track centers being 9 ft. 2¼ in. (2.80 m.). Where the streets are narrow the cars run out one street and return on another. The shortest radius of curve is 59 ft. 1 in. (18 m.),



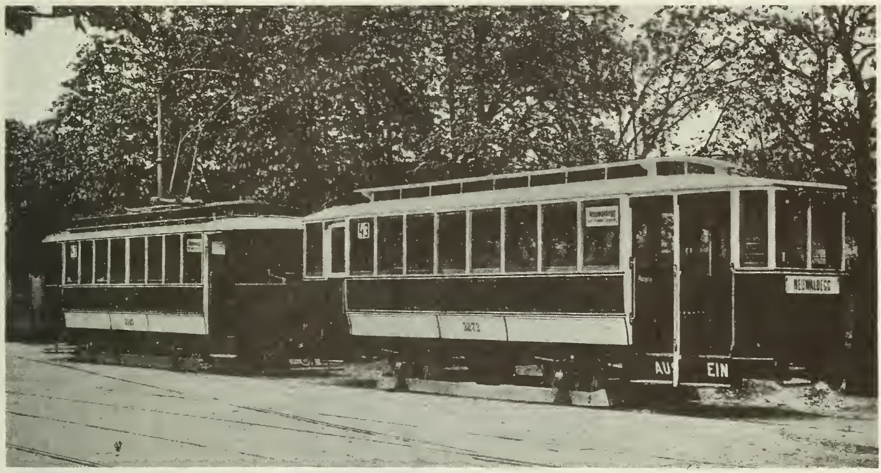
VIENNA MUNICIPAL TRAMWAYS. A view on the Ring-Strasse, showing the center pole overhead construction and a typical two-car train. With the exception of about 10 miles of conduit system, the cars receive the current from overhead conductors

and the steepest gradient is 3.73 per cent. The ends of the principal lines are laid out in a loop; all recent extensions are of the same arrangement. A double loop station is at the principal cemetery, and at the race course there are eight tracks available for 60 trains of two cars each.

The power station has its own special management and consists of two separate plants, providing current for lighting and power as well as for the tramways. The generators are driven by triple-expansion engines of 3000 effective hp. each and steam turbines of 10,000 hp. each. The central station furnishes alternating current of 5000–5500 volts, which is transformed at eight sub-stations to 500–580 volts direct current. The power plants are equipped with boilers, engines, generators, coal conveyors, crushers, mechanical stokers, feed-water heaters, super-heaters and furnaces of the most modern types. The feed water is pumped from deep wells and the water for the condensers is drawn from the Danube Canal. The total capacity of the two power stations is 50,350 kw. or 80,000 effective hp. In 1910 the output was 118,414,770 kw. hours, of which 44,473,164 were used by the tramways—a daily average of 121,844 kw. hours.

All of the motor cars have closed bodies with one or two compartments, the extra compartment being for the use of smokers. In the cars of older construction the seats are placed longitudinally, while those of recent construction have transverse seats. The platforms of the older cars are open and the later types are vestibuled. Most of the cars are built on

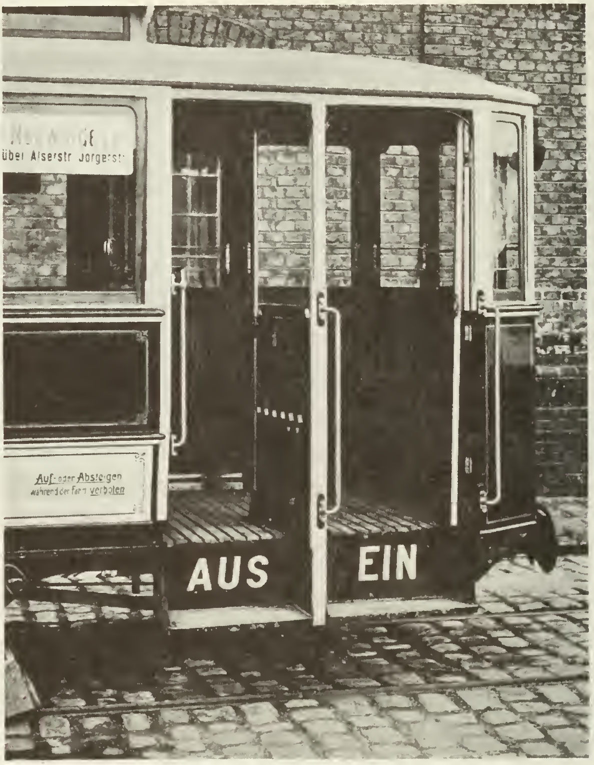
VIENNA MUNICIPAL TRAMWAYS. The Brigittenau Car House, one of 15 car houses located in different sections of the city



Vienna Municipal Tramways. The latest type of motor car, with trailer car arranged for prepayment method of fare collection

the usual form of underframe, but some have independent underframes. The window arrangements in all of the motor cars are the same and consist of single sashes which drop into wall pockets. The motor cars are 19 ft. 6 in. (5.950) m. over the bodies and 32 ft. (9.750 m.) over the platforms; width of car body, 7 ft. 2$^1/_5$ in. (2.200 m.), and width over all, 7 ft. 6 in. (2.274 m.). Weight of car without electrical equipment, 18,975 lb. (8607 kg.); weight of one motor, 3476 lb. (1577 kg.); weight of electrical equipment, 11,102 lb. (5036 kg.); total weight of completely equipped car, 30,077 lb. (13,643 kg.).

The trailer cars are of both open and closed types, some of the latter being constructed with windows which can be removed. These cars are also of the single and double compartment plan, the older types having longitudinal, and the modern types transverse, seats. Smoking is permitted in the trailer cars, and trains of one motor car and one or two trailer cars are operated. A few of these cars have center platforms, but the majority have the end platforms, and, as with the motor cars, those of older construction have open platforms and those of later type are enclosed. The more recent trailer cars have separate steps for entrance and exit, as shown in the photographs. The trailer cars have the following dimensions: Length of car body, 19 ft. 4 in. (5.900 m.); length over platforms, 29 ft. $10\frac{1}{3}$ in. (9.100 m.); width of car body, 7 ft. $2\frac{1}{5}$ in. (2.200 m.); width over all, 7 ft. 6 in. (2.274 m.). Weight of car body, 11,497 lb. (5215 kg.); weight of electrical equipment, 407 lb. (185 kg.); total weight of car completely equipped, 11,905 lb. (5400 kg.).

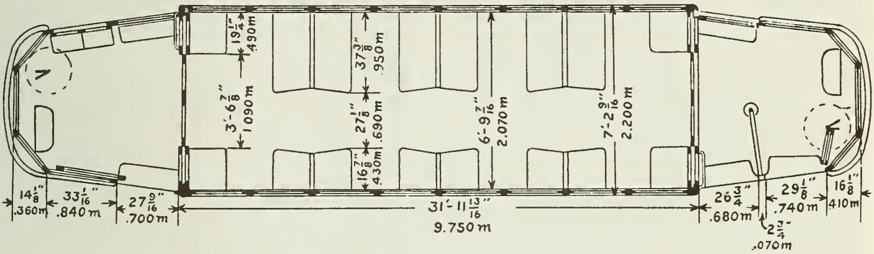


Vienna Municipal Tramways. The entrance and exit steps are set within the line of the platform. The two-leaf folding door at the entrance and the gate at the exit when closed are over the outer edge of the step treads

The Vienna Municipal Street Tramways has 1330 motor cars and 1417 trailer cars for passenger service; 6 of each type are equipped for special excursion purposes. Service cars consist of 2 motor lorries, 16 freight cars, 2 crane cars, 2 boiler cars, 32 salt cars, 3 carrier cars, 3 snow sweepers, and 178 plows (of the latter, 109 are drawn by horses). Thirteen motor omnibuses are used on three lines connected with the tramway system. Auto tower cars and ladder cars are also maintained, and a number of other autos are used for special purposes. The cars are housed in 15 car sheds in different parts of the city, each having its workshop for effecting minor repairs. The principal repairs are made at a main workshop.

A year ago the staff consisted of about 10,000 employees.

The tariff in force on the tramways is the zone system, which, however, differs for certain portions of the day and also for Sundays and holidays. Outside of the Communal radius there is a special tariff, according to the distance traveled. On special occasions night cars are added, which are not on the regular time-table and on which extra fares are charged. Besides the ordinary single tickets, season tickets are issued for one or six months, entitling the passenger to ride over any portion of the street railway system.



Vienna Municipal Tramways. Floor plan of the trailer car shown on page 7

In order to be able to judge the requirements of the traffic, statistics are prepared showing the number of passengers carried on the different lines at all hours of the day, for holidays and special occasions, as well as in the regular service, enabling the management to closely approximate the correct number of cars to be placed on the lines at any time. In these statistics careful note is made of the weather conditions, as stormy weather increases the regular daily traffic and decreases the holiday traffic. In 1910, on the electric lines the number of cars in service was as follows: Weekdays, 933 motor cars and 1073 trailers; Sundays and holidays, when the weather was fine, 990 motor cars and 1240 trailers; on a special day, 1003 motor cars and 1057 trailers. The total number of passengers carried in that year was 271,584,931.

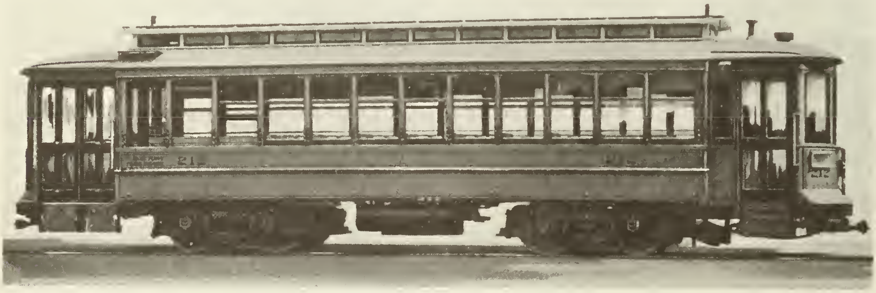
We are indebted to Mr. Ludwig Spangler, general manager of the Vienna Municipal Tramways, for the foregoing article and photographs.

MORE SEMI-CONVERTIBLE CARS FOR UTICA, N. Y.

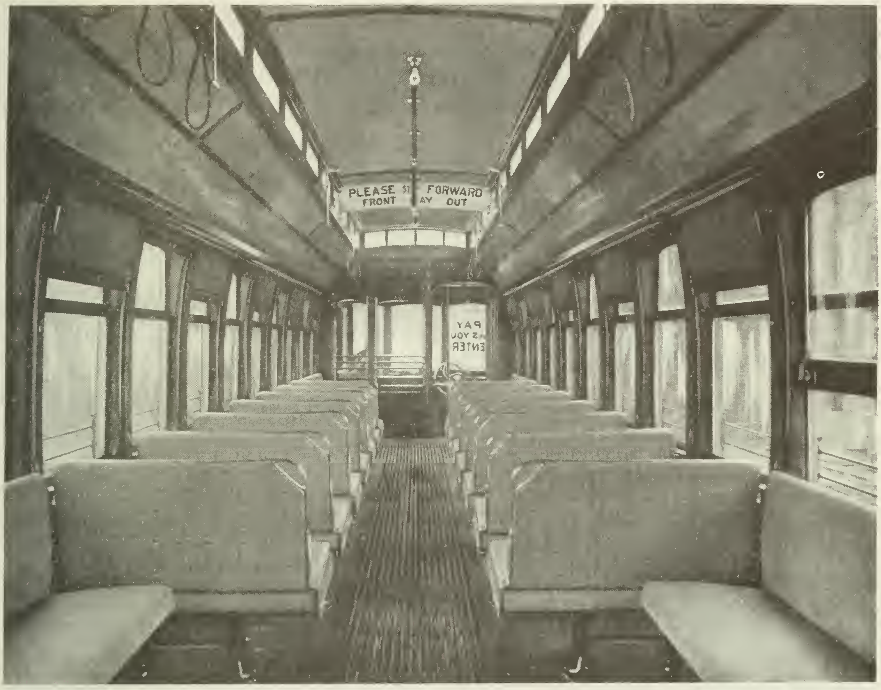
CITY AND SUBURBAN TYPES

THE Utica & Mohawk Valley Railway Company has added eight new cars to the city lines and four cars to the suburban system, both lots being of the Brill semi-convertible type and built by the G. C. Kuhlman Car Company. The Utica & Mohawk Valley Railway Company was among the first to adopt Brill semi-convertible cars, the first lot being twelve cars built by the Brill Company in 1902, and since that time all of the cars used on the system have been of this type. The new city cars are arranged for single-end operation and have a number of interesting features, as the photographs and diagram show. While they are distinctly modern, the general design is conservative and is of a standard character which would meet the general traffic conditions of any city in the country having a population of from 100,000 to 500,000, where the lines are arranged with loop terminals.

The side sills are of long-leaf yellow pine, 4 in. by 7¾ in.,

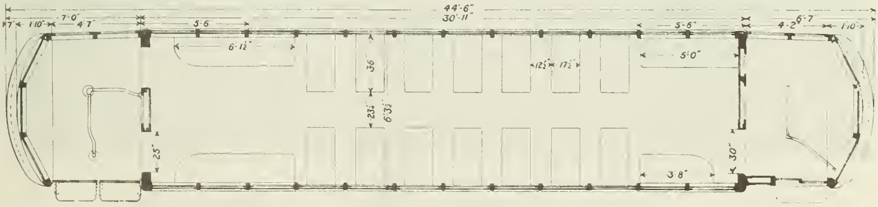


CARS FOR UTICA. The folding steps at the front and rear are operated by air in conjunction with the doors; those at the rear are separate and arranged to be operated individually. The lower parts of the doors are fitted with clear wire-glass. The cars are mounted on Brill No. 27-FE1 Trucks



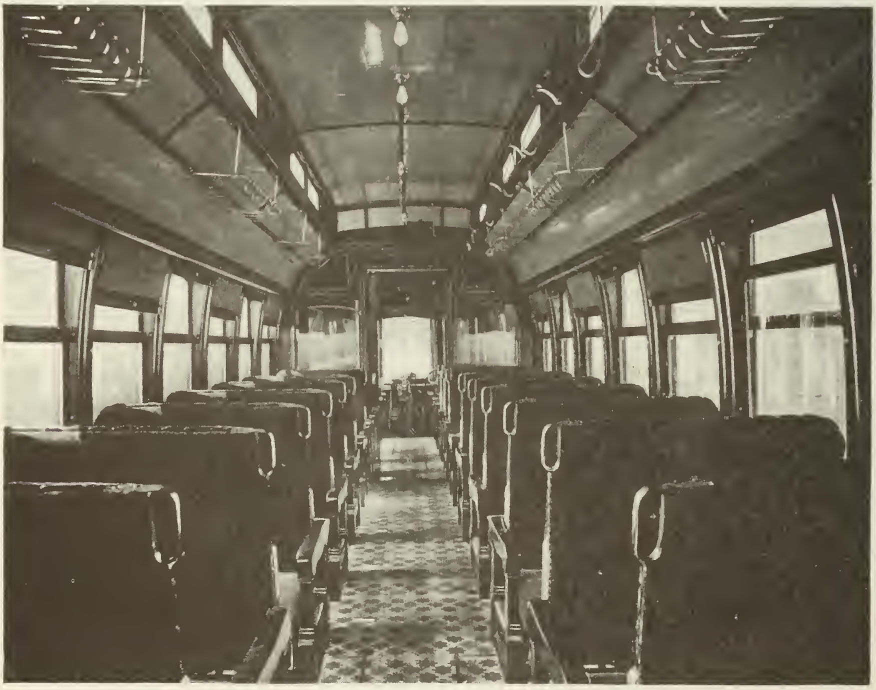
Cars for Utica. The Brill semi-convertible window system was adopted for the cars of the Utica lines in 1902. As the lines are laid out with loop terminals, the cars are arranged for single-end operation and have stationary-back seats

with sill plates on the inside of 15 in. by ⅜ in. steel; these steel plates extend beyond the car body to the vestibule corner post on the paneled side of the platform. The oak end sills are 5½ in. by 6⅞ in., and have steel plates 8 in. by 3¾ in., reinforcing the corners; these plates extend beyond the bolster, 9 ft. 9 in. from the corner and 15 in. along the end sill. Inside this corner plate is another plate, 8 in. by ¾ in., extending back along the side sill about 4 ft. and along the



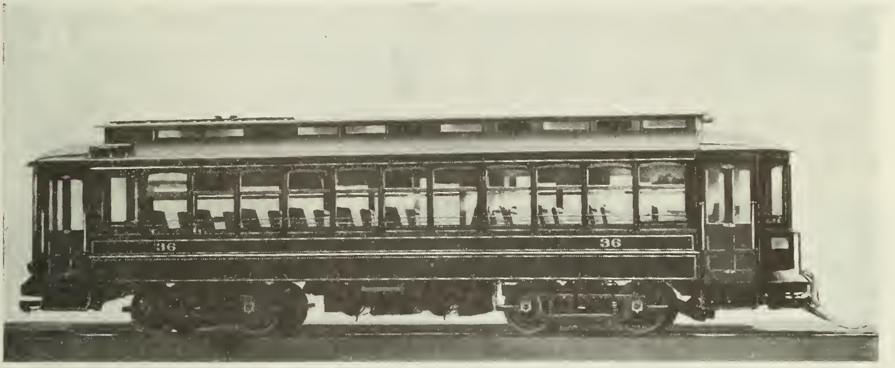
Cars for Utica. Floor plan of the car shown on the opposite page. Seating capacity, 43.

end sill 12 in.; this plate is bolted to the reinforcing plate of the outside platform sill. A ¾-in. tie rod is brought through the side sills just inside the end sill; there are five of these tie rods across the center of the underframe between the motor traps. The center platform angles extend well back of the body bolsters. The center of the underframe is reinforced by needle beams of special construction, consisting of two channels bolted through the side sills and also secured and braced by large gusset plates. Diagonal braces stiffen the structure against cornerwise stresses. Inside trusses of 1⅛-in. rod are placed 8¾ in. above the floor line and are supported on stout castings and anchored under the end sills. The bolsters are made of 9-in. by 1-in. plates with the ends of the upper plates bent down under the side sills. The side fram-



CARS FOR UTICA. Large windows, which may be entirely raised into roof pockets during warm weather, and comfortable high-back seats, add much to the attractiveness of the interior. The woodwork is of mahogany, plainly finished ing includes 3¼-in. side posts and 3⅝-in. corner posts. Below the fender rails the sides have a sheathing of No. 16 sheet steel.

The steps at the front and rear are operated in conjunction with the doors and those at the rear are separate and are arranged to be operated individually. Instead of the usual wooden panels the lower parts of all the outside doors are fitted with clear wire glass. The interiors are finished in mahogany and the seats are of the Brill stationary-back type and the cars are mounted on Brill No. 27-FE1 trucks, standard on the system.



CARS FOR UTICA. The suburban cars are equipped for double-end operation and have a seating capacity of 48. The cars are mounted on trucks of the Brill No. 27-M.C.B.1 type

The four cars for the suburban service have underframes of the same general design as the city cars, but are arranged for high-speed trucks of the Brill No. 27-MCB1 type. The cars have entrances at both sides of the platforms and are equipped for double-end operation. Mahogany is used for the interior finish, and a mahogany and glass partition divides the cars into smoking and general compartments. Both types of cars are equipped with Brill track scrapers, sand boxes and other patented specialties.

Following are the principal dimensions of the city cars:

Length of body	30 ft. 11 in.	Length of rear platform	6 ft. 5 in.
Length over platforms	43 ft. 4 in.	Centers of side posts	2 ft. 6 in.
Length of front platform	6 ft. 0 in.	Width over sills	8 ft. 1½ in.

Width over posts	8 ft. 3½ in.	Seating capacity	43
Extreme width	8 ft. 6½ in.	Type of trucks	Brill No. 27-FE1
From track to side sills	2 ft. 10⅛ in.	Wheel base	4 ft. 6 in.
Sills over trolley boards	9 ft. 5½ in.	Diameter of wheels	35 in.
From floor to headlining	8 ft. 5¼ in.	Type of motors	G.E.216--4
From track to step	17½ in.	Weight of trucks	17,280 lb.
From step to platform	14½ in.	Weight of motors	10,920 lb.
From platform to floor	9 in.	Total weight	51,640 lb.

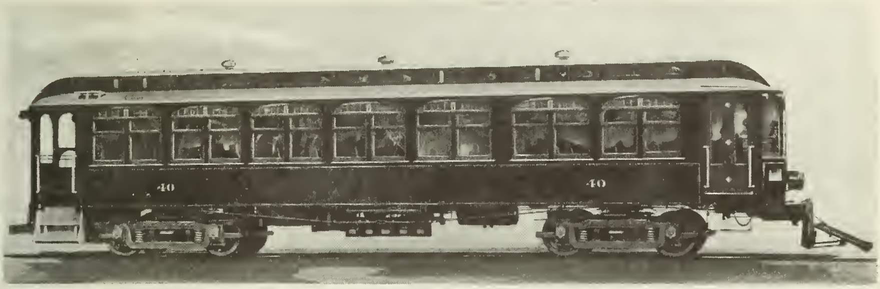
The following are the principal dimensions of the suburban cars:

Length of body	34 ft. 4 in.	From track to side sills	2 ft. 10 5/16 in.
Length over platforms	43 ft. 9 in.	From sills over trolley boards	9 ft. 5½ in.
Length of platforms	4 ft. 8½ in.	From floor to headlining	8 ft. 7 5/16 in.
Length of smoking comp.	11 ft. 9 in.	From track to step	17 in.
Centers of side posts	2 ft. 9 in.	From step to platform	16 in.
Width over sills	8 ft. 1½ in.	From platform to floor	9 in.
Width over posts	8 ft. 3½ in.	Seating capacity	48
Extreme width	8 ft. 4 in.	Wheel base	6 ft. 3 in.

INTERURBAN CARS FOR THE NORTHERN OHIO TRACTION COMPANY

"WASHINGTON" TYPE WINDOWS

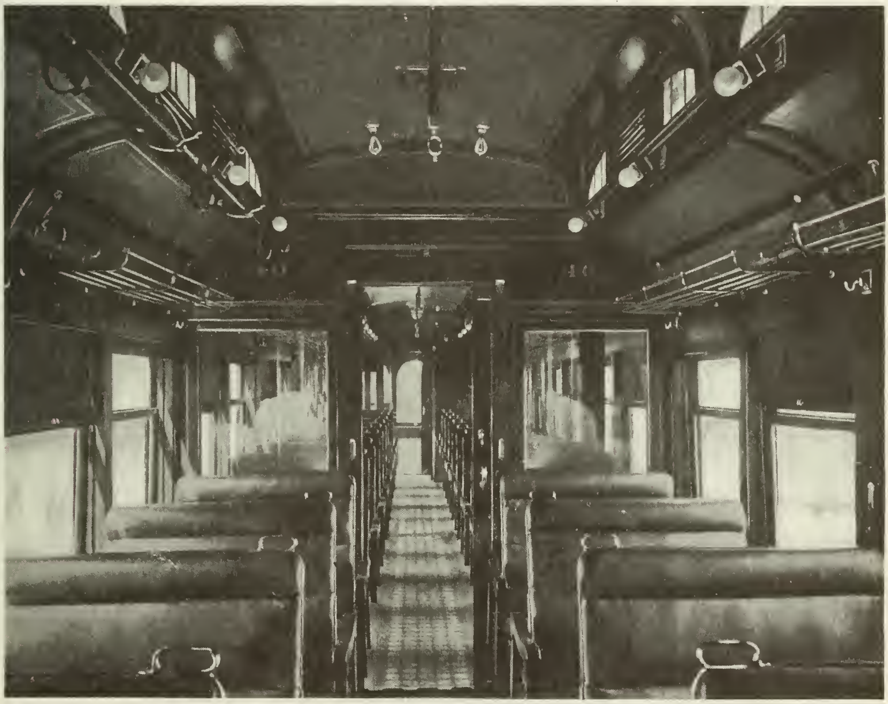
EIGHT handsome cars have been received by the Northern Ohio Traction Company from the G. C. Kuhlman Car Company and are counterparts in nearly every respect of six cars furnished by the same builder in 1910. The new cars have the special side construction which characterizes many of the recent interurban types from the Kuhlman plant. A 5/16 in. steel plate, 30 in. wide, extending the full length of the car body, constitutes the principal side member. This plate is reinforced with angles at top and bottom and is covered by a truss plank made of boards in full-length sections, tongue-and-grooved, glued together and bolted to the plate after a thick paste of white lead is applied; over this plank is an outer sheathing of tongue-and-grooved poplar boards, glued and nailed securely. This construction avoids the usual side wall trusses and braces and permits the inside lining to



NORTHERN OHIO TRACTION CARS. The Brill "Washington" type of window gives the twin-window effect to the exterior of the car and at the same time permits the use of the regular double-sash arrangement

be set in between the posts and thus saves 5½ in. to the interior width.

The window arrangement is of the Brill "Washington" type, in which the usual letter panel is omitted and the space occupied for arch-top sashes which span each pair of windows.



NORTHERN OHIO TRACTION CARS. Three ventilators are placed along the center of the dome, and ventilators are also placed at the center of the deck side sashes. Seating capacity, 54

This arrangement gives the Pullman window effect to the exterior of the car and obviates the objection often made in connection with Pullman windows, that of darkening the interior. Reference to the photograph of the interior will show that the window system, as seen from the interior, is of the regular double-sash type, the lower sash being capable of raising its full height. The interiors are finished in selected Philippine mahogany without carvings and grooves to catch dust and dirt. The aisles are covered with interlocking rubber tiling and the toilet room has a flooring composed of a single marble slab set in cement.

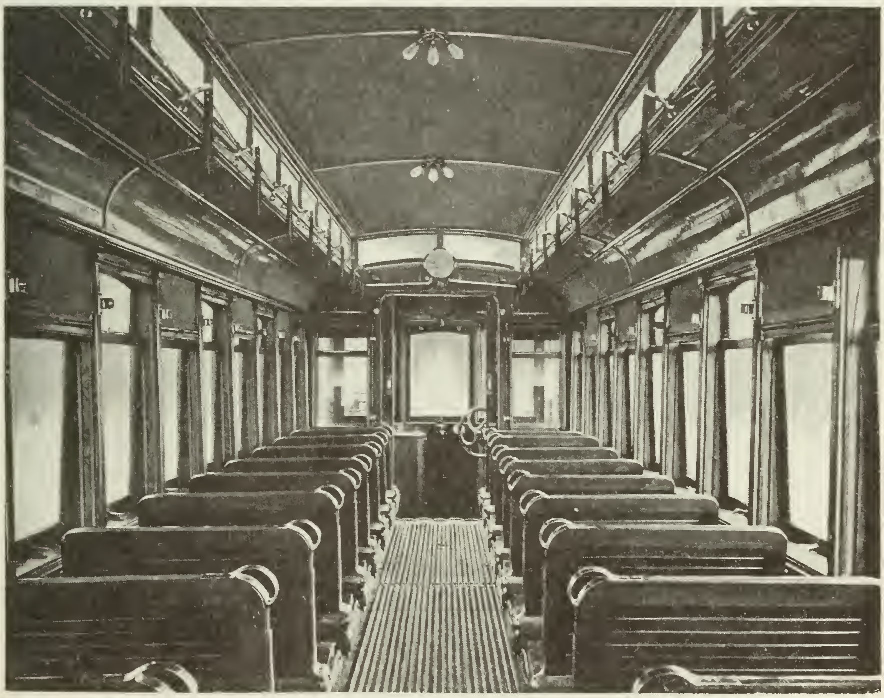
Length of body	42 ft. 1¾ in.	From sills over trolley boards	9 ft. 3¾ in.
Length over platforms . . .	52 ft. 10¾ in.	From floor to headlining . .	8 ft. 7¼ in.
Length of platforms . . .	4 ft. 9 in.	Track to step	15⅜ in.
Length of smoking comp. .	11 ft. 9$\frac{7}{16}$ in.	Risers	13½ in.
Centers of side posts . . .	34¼ in.	Platform to floor	7⅛ in.
Width over sides	8 ft. 6 in.	Seating capacity	54
Extreme width	8 ft. 8 in.	Total weight	74,680 lb.
From track to sills	42⅜ in.		

ADDITIONAL CARS FOR SHREVEPORT, LA.

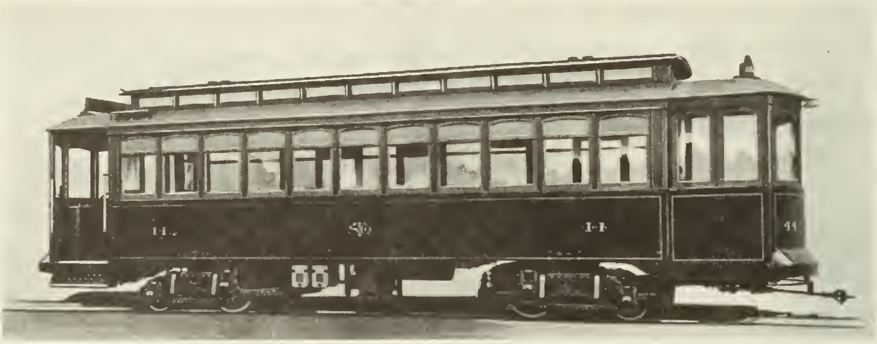
BRILL No. 39-E TRUCKS

THE Shreveport Traction Company has recently added five cars of the type illustrated to its equipment of 23 passenger cars, all of which have been built by the American Car Company. These last cars are the first to be mounted on Brill No. 39-E trucks. The company operates 18 miles of track, having more than doubled the trackage in the last 10 years. Shreveport is in the northwestern part of Louisiana and is the second city in population and commercial importance in the State. It is situated on the navigable Red River, which flows into the Mississippi, and thus gives it water connection with the other large cities of the State. It is also an important railway center and ships large quantities of lumber and cottonseed oil. The population is 30,000, and both city and neighborhood are developing rapidly.

The cars are of the builder's standard straight-side, drop-sash construction, with enclosed vestibules and entrance at diagonally opposite corners. Yellow pine side sills with 15-in. by ⅜-in. steel plates on the inside, center crossing and end sills of white oak, constitute the bottom framing. Cherry is used for the interior finish, and slat push-over-back seats; the ceilings are of bird's-eye maple three-ply veneer. The upper window sashes are stationary, and the lower arranged to drop into pockets which are provided with hinge covers. The seats, sand boxes, platform gongs, signal bells and other patented specialties are of Brill manufacture.



Cars for Shreveport. The upper window sashes are stationary and the lower drop into pockets having hinged covers. The seats are of the Brill "Winner" type; seating capacity, 44



CARS FOR SHREVEPORT. The cars are arranged for double-end operation, with entrances at diagonal corners. The vestibule entrances are equipped with folding gates

The following are the principal dimensions:

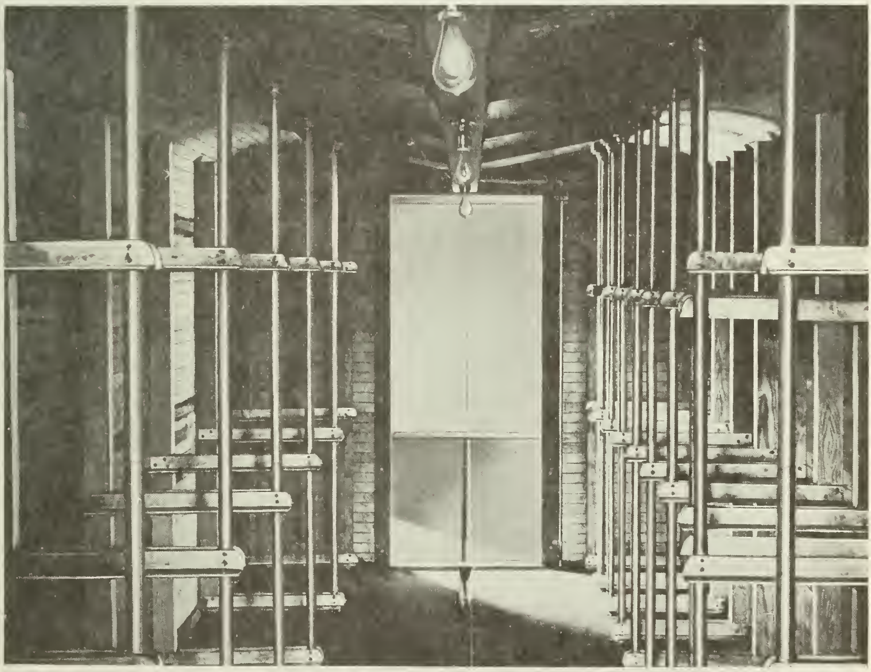
Length of body	28 ft. 10 in.	From step to platform	14 in.
Length over platforms	39 ft. 10 in.	From platform to floor	9⅝ in.
Length of platforms	5 ft. 6 in.	Seating capacity	44
Centers of side posts	2 ft. 6 in.	Wheel base	4 ft. 6 in.
Width over sills	8 ft. 4 in.	Diameter of wheels	33 in.
Width over posts	8 ft. 4 in.	Size of journal	3¾ in.
Extreme width	8 ft. 6 in.	Type of trucks	Brill No. 39-E
From track to sills	2 ft 8½ in.	Type of motors	West. 101-B—2-40 hp.
From side sills over trolley boards	9 ft. $5\frac{9}{16}$ in.	Weight of car body	18,000 lb.
From floor to headlining	8 ft. $3\frac{7}{16}$ in.	Weight of trucks	10,000 lb.
From track to step	16⅝ in.	Weight of motors	5,460 lb.

REFRIGERATOR CAR FOR THE LEXINGTON INTERURBAN LINES

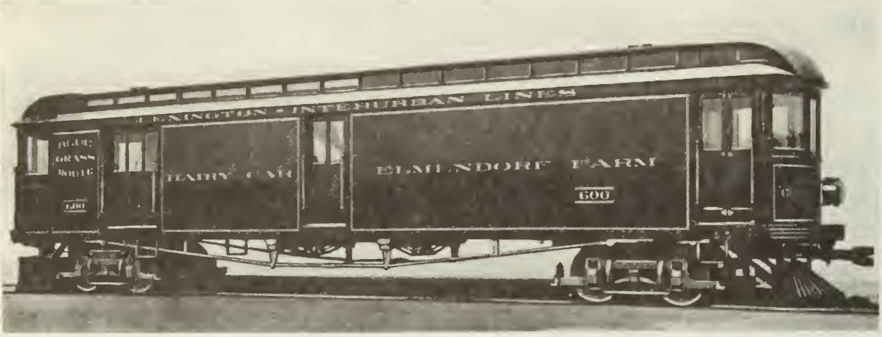
27-M.C.B.2 TRUCKS

THE American Car Company has delivered to the Lexington Interurban Lines an interesting refrigerator car which is for use on its division reaching the celebrated Elmendorf Farm. This farm is in the heart of the blue grass region of Kentucky and comprises 8,000 acres. It is owned by Mr. James B. Haggin, of New York, and is known the world over for its thoroughbred racing horses, cattle and other stock. Many of the names of the horses and bulls are familiar in racing circles and among breeders. The dairy part of the farm is remarkable for its completeness in every particular and the new car is an evidence of its progressiveness. A crew is constantly employed in handling the car, which makes two trips a day from the farm to Lexington, a distance of 7 miles, loaded with milk and other dairy products. As soon as the car is unloaded it is placed on a siding, where the freight compartment is filled with sundry supplies for the farm. It is also used as an electric locomotive and hauls freight, coal and other materials used by this great establishment.

The refrigerator compartment is furnished with racks for the accommodation of 150 cases of bottled milk. The sides



Refrigerator Car for Lexington. The racks in the refrigerator compartment have a capacity of 150 cases of bottled milk. The bottom of the ice-chest is shown overhead. The only means of access to the compartment is through the door shown, which leads from the ice compartment. Ice is put into the chest through an opening over this door and ends of this compartment are sheathed with tongue-and-grooved pine over a felt and sheet cork lining. Overhead in the space covered by the monitor deck there is a long ice chest which is filled through a refrigerator door in the ice compartment. The ice compartment and the refrigerator compartment have a communicating door, which is the only means of access to the refrigerator compartment. Separated from the ice compartment by a solid partition is a baggage compartment which extends to the end of the car, the motorman's position being partitioned by iron piping. At the other end of the car is a vestibule which is separated from the refrigerator compartment by a solid bulkhead. The main members of the bottom framing consist of 4¾ by 7¾ in. yellow pine side sills, plated with 8 by 5 in. steel; the center sills are 6 in. I-beam, with pine fillers, extending from bumper to bumper.



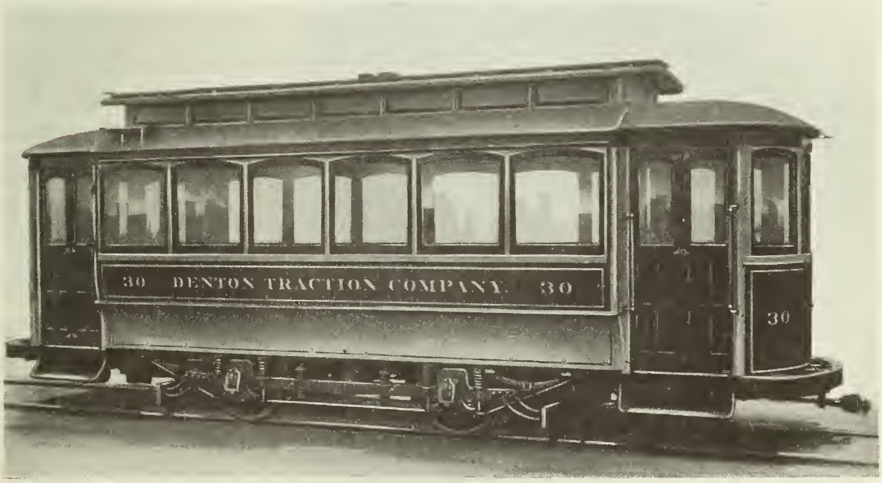
REFRIGERATOR CAR FOR LEXINGTON. The car has three compartments, one for bottled milk, one for ice, and one for miscellaneous freight. The car was mounted on temporary trucks for photographing and was afterward mounted on trucks of the Brill No. 27-M.C.B.2 type

Length of body	50 ft. 0 in.
Length over platforms	48 ft. 0 in.
Length of front platform	4 ft. 5¾ in.
Length of baggage comparment	12 ft. 3⅝ in.
Length of ice compartment	13 ft. 11⅜ in.
Length of refrigerator compartment	15 ft. 6 in.
Centers of side posts	24¼ in.
Width over sills	8 ft. 6 in.
Width over posts	8 ft. 6 in.
Extreme width	8 ft. 7⅝ in.
From track to sills	42½ in.
From sills over trolley boards	9 ft. $\frac{11}{16}$ in.
From floor to headlining	6 ft. 8½ in.
Type of trucks	Brill No. 27-M.C.B.2
Type of motors	G.E.—574-50 h.p.
Weight of car body, approximately	20,000 lb.
Weight of trucks	22,000 lb.
Weight of motors	14,385 lb.

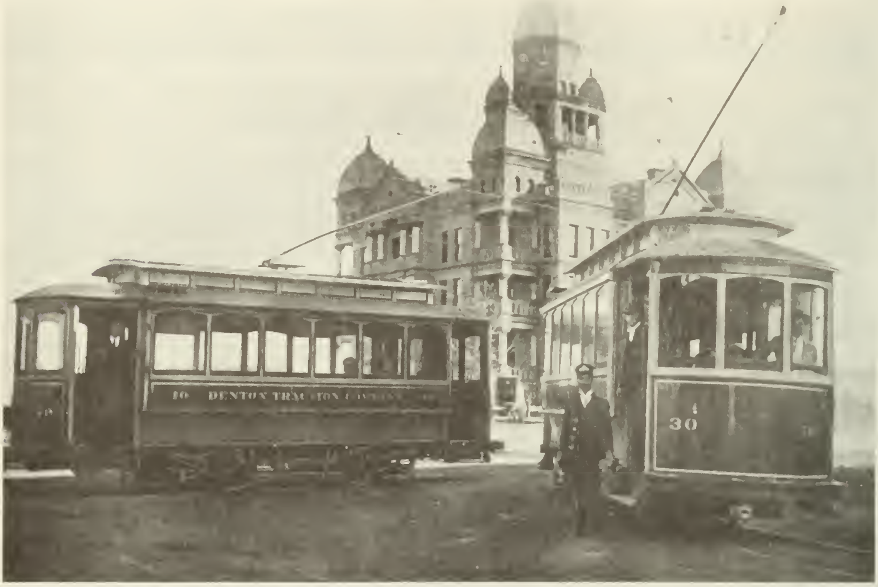
SINGLE-TRUCK CARS FOR DENTON, TEX.

BRILL No. 21-E TRUCK

THE Danville Car Company shipped during the month of October several cars to the Denton Traction Company for use in the city of Denton, which is north of Dallas and Fort Worth and about 35 miles distant from each. The district, of which the city is the business center, is exceedingly fertile and prosperous and the city enjoys many advantages in location and transportation which insure a rapid growth. The city railway system consists of two divisions, one reaching the North Texas State Normal College in the western suburbs and also Hiland Park, the popular amusement resort of the neighborhood; the other division serves the northern part of the State, extending to the College of Industrial Arts, which is also a State institution, with an enrollment of about a thousand students. A 20-minute schedule is maintained over both divisions and a 10-minute service between the Union Station and the center of the city.



CARS FOR DENTON. Standard 18-ft. body cars with longitudinal seats and vestibuled platforms. The cars are mounted on Brill No. 21-E trucks



CARS FOR DENTON. A diverging point of the Denton lines at the County Court House

The new cars are of the standard 18-foot body type, with longitudinal slat seats and an enclosed vestibule at each end. The body ends are fitted with mutually-operating doors; the window sashes are composed of single lights and drop into pockets. Cherry is used for the interior woodwork and seats. The bottom framing is of substantial construction and is braced at the ends by truss pipes from the truck. In every particular the cars are well suited to the service conditions of Denton.

The principal dimensions of these cars are as follows:

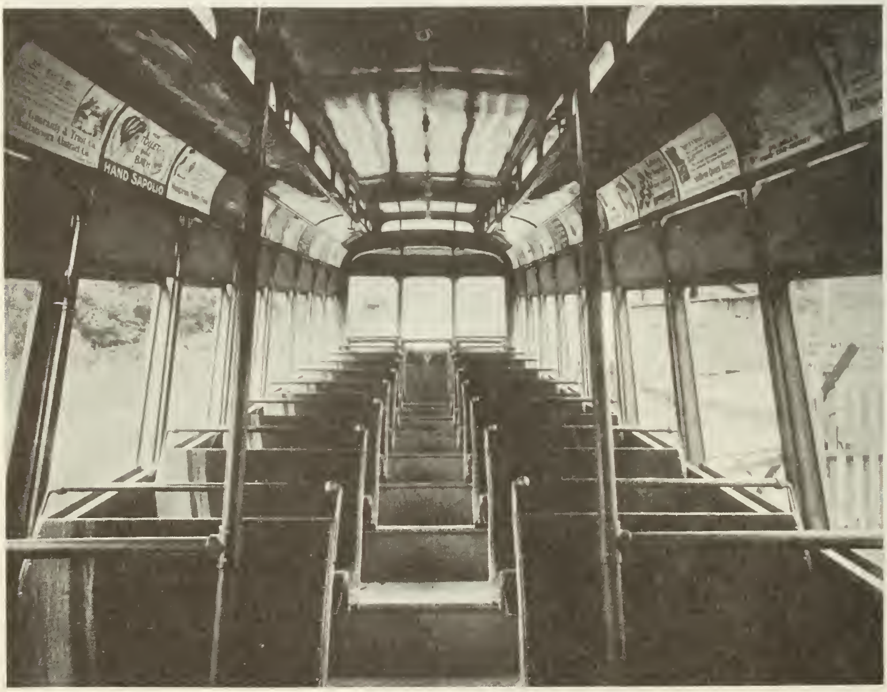
Length of body	18 ft. 0 in.	From floor to headlining	8 ft. 2½ in.
Length over platforms	27 ft. 0 in.	From track to step	13⅝ in.
Length of platforms	4 ft. 8½ in.	From step to platform	13 in.
Centers of side posts	2 ft. $11\frac{1}{24}$ in.	Platform to floor	6¼ in.
Width over sills	6 ft. 3 in.	Seating capacity	26
Width over posts	7 ft. 6 in.	Type of trucks	Brill No. 21-E
Extreme width	7 ft. 9½ in.	Wheel base	7 ft. 6 in.
From track to side sills	2 ft. 2⅝ in.	Diameter of wheels	33 in.
From side sills over trolley boards	9 ft. 0¾ in.	Size of journal axle	4½ in.
		Type of motors	Allis-Chalmers-R35

CARS FOR THE LOOKOUT MOUNTAIN INCLINE RAILWAY

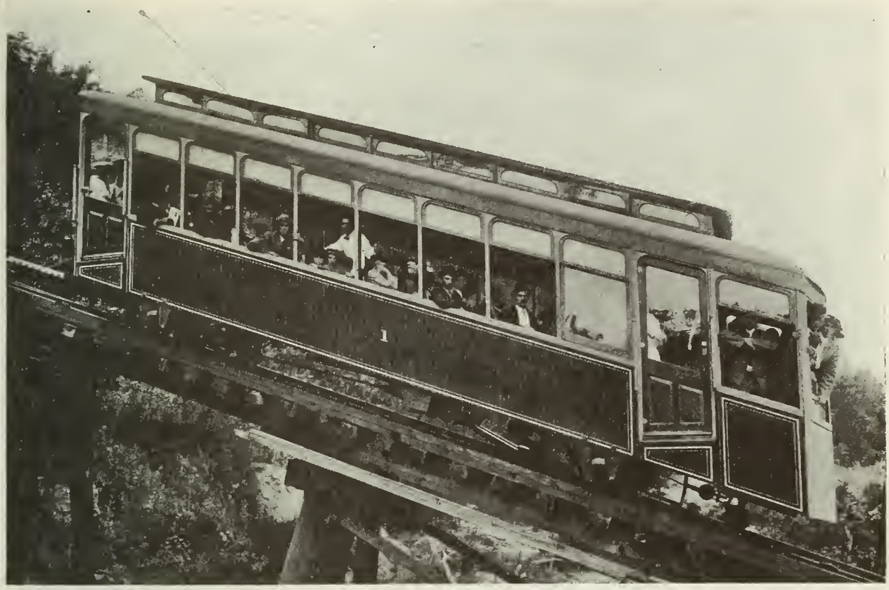
TWO cars of the type illustrated have been furnished to the Lookout Incline & Lulu Lake Railway by the G. C. Kuhlman Car Company. This is one of the longest and steepest incline cable roads in the country, being 4800 ft. in length and having a grade in one place of 72 per cent. The line connects with the railway system of the Chattanooga Railway & Light Company, by which it is controlled, and the terminus at the top of the mountain is directly in front of Lookout Inn, 2500 ft. above the sea level, at which point the passengers are transferred to the cars of the Lookout Mountain Railway, a five-mile electric line ex-

LOOKOUT MOUNTAIN INCLINE CARS. A 72-per cent grade near the top of the Lookout Mountain Incline Railway tending around the mountain, from which splendid views are obtained of no less than seven states. The Chickamauga Missionary Ridge and Lookout battlefields and other points of interest are seen, and during the season the trip up the incline and around the mountain is made by thousands of persons from all parts of the country. Point Park, on the top of the mountain, which is reached by the lines, is a Government property and has a museum containing relics from the famous battlefields of the South.

The floor of the new cars is built at a grade of 35 per cent. as the grade of the track commences at the foot of the incline with a 10 per cent raise and finishes at the top with a 70 per cent raise. The seats have stationary backs and face down grade. The wheels for one car have flanges on the outsides of the rails, while the wheels of the other car run inside the



LOOKOUT MOUNTAIN INCLINE CARS. The floor of the cars is built at a 35-per cent grade. The seats have stationary backs and the windows are of the drop-sash type



LOOKOUT MOUNTAIN INCLINE CARS. One of the new cars built by the G. C. Kuhlman Car Company. Platform steps are unnecessary, as the stations at the top and bottom of the incline have platforms of special construction

rails to obviate the use of moveable switches at the point of the roadway where the single-track diverges into separate lines to allow the cars to pass.

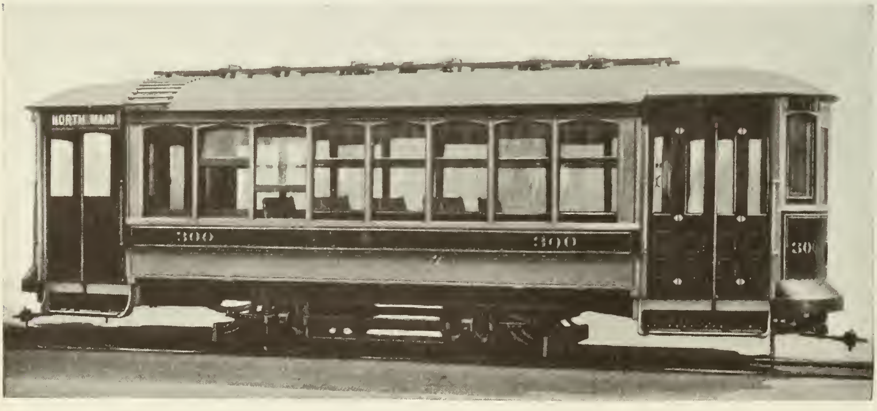
The bottom framing of the cars is staunchly constructed and reinforced with steel plates and knees to give a wide margin of strength over the greatest possible stresses of load and draft apparatus. The general features of the cars may be seen in the photograph. The Brill companies have furnished the cars for Pike's Peak Railway, the Mt. Tamalpais Railway and other mountain railways. The first cars that were ever built by the Brill Company were of this class and were for the Clark Summit Incline Railway and built in 1868.

Length of body	23 ft. 8¾ in.
Length over platforms	31 ft. 1¾ in.
Length of platforms	3 ft. 8½ in.
Centers of side posts	2 ft. 7½ in.
Width over sides	8 ft. 2½ in.
Extreme width	8 ft. 5½ in.
From track to side sills	22 in.
From side sills over trolley boards	9 ft. 9⅞ in.
From floor to center of head-lining	9 ft. 1⅜ in.
Seating capacity	32
Total weight (approximately)	13,000 lb.

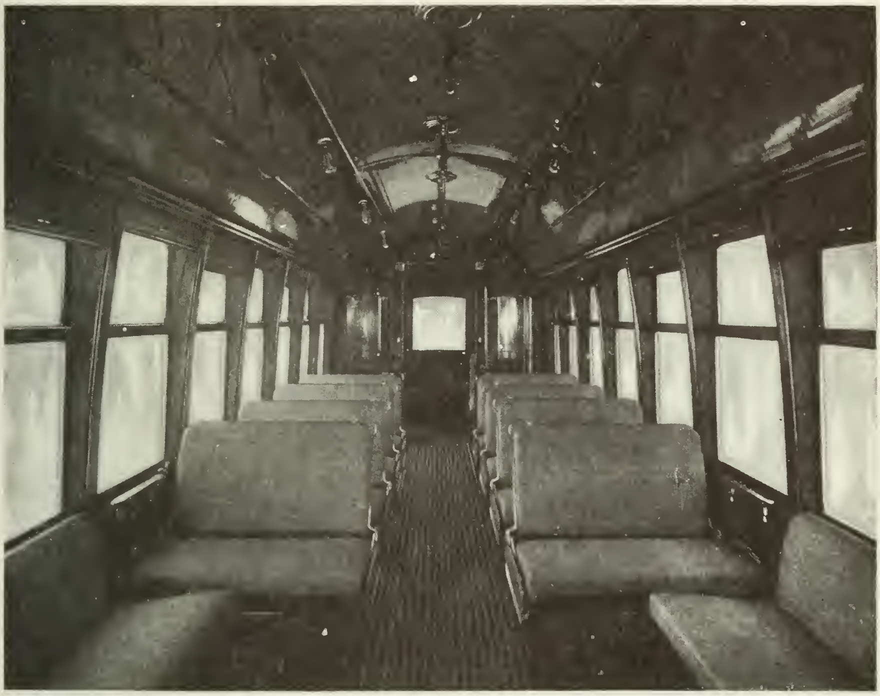
NEW CITY CARS FOR THE EASTON TRANSIT COMPANY

BRILL PLAIN ARCH ROOF

THE Easton Transit Company has lately put in service a number of single-truck semi-convertible cars built by The J. G. Brill Company. The Brill semi-convertible cars have been used on the Easton lines since 1903, both for city service and on the interurban divisions, the city cars being mounted on Brill No. 21-E single-trucks and the interurban cars on Brill high-speed trucks No. 27-E type. The new cars differ from the former city cars in a number of important particulars; they are for use on the lines in Easton and vicinity, and it is the intention of the management to equip all the city lines with this type. The company operates its city service on a 10-minute headway, starting from Center Square, in the business section of Easton, and running north, south, east and west to the outlying districts of the city for an average distance of about two miles. All of these lines contain steep grades ranging from 8 to 14 per cent. The frequency of the



Cars for Easton. The cars have 6-ft. platforms, enclosed with 4-leaf doors which fold against the body ends. The trucks are of the Brill No. 21-E type

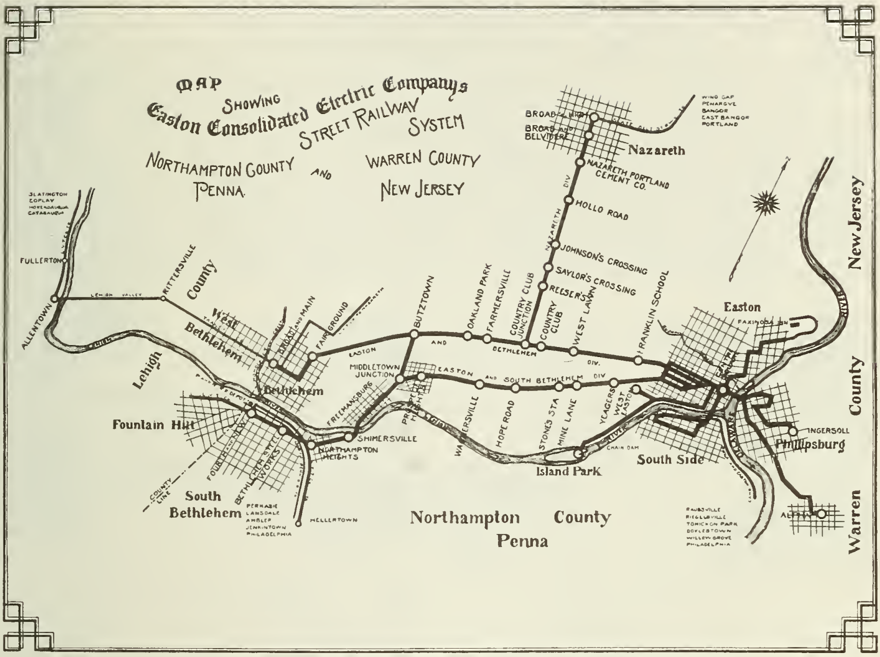


Cars for Easton. Six ventilators along the center of the roof give ample change of air. The seats are of the Brill "Winner" type and have a seating capacity of 32

service, shortness of the lines and the steepness of the grades on which the cars are operated make a light-weight, single-truck car more desirable and economical than a double-truck car, and for these reasons the semi-convertible type with the plain arch roof has been adopted as the standard of the system for city service. It is the intention of the company to introduce the prepayment feature as soon as enough cars are acquired to equip one line, and it is the purpose to operate these cars throughout the year and ultimately replace the present single-truck cars, except on the park division during the summer.

The city of Easton is on the eastern border of Pennsylvania, at the junction of the Delaware and Lehigh Rivers, and a large section of the city lies across the Delaware, in the State of New Jersey. The city is an important industrial center of about 30,000 population and is in the heart of the greatest cement region in the United States. It is on the main line of the Lehigh Valley Railroad and is also served by the Pennsylvania and New Jersey Central Railroads. The section across the river, known as Phillipsburg, has a population of 12,000 and is joined to Easton by bridges, over one of which the Easton Transit Company's lines cross. Bethlehem and South Bethlehem, which are served by the system, have a combined population of nearly 40,000. The latter is an important steel center and the great plant of the Bethlehem Steel Corporation is located there. Nazareth is also connected by the lines and is a busy commercial center of the cement region. About 52 miles of trackage is operated by the Easton Consolidated Company and the rolling stock consists of over 100 cars.

CARS FOR EASTON. View of Easton from Phillipsburg and overlooking the junction of the Delaware and Lehigh Rivers



CARS FOR EASTON. The combined population of the cities shown on the map is over 100,000

The new cars are built on the standard design of single-truck semi-convertible car underframe, having side sills of yellow pine, 3⅜ in. by 4 in., reinforced by 9 in. by ⅝ in. steel plates. The oak end sills are 3½ in. by 6⅞ in.; the truck sub-sills, 6¼ in. by 7 in., and the transverse floor timbers, 3½ in. by 3¾ in., are also of oak. The body framing includes corner posts 3⅝ in. thick and side posts 2¾ in. thick. The roof is of the Brill plain arch design and is strengthened with concealed steel rafters. The platforms, which are 6 ft. long, are enclosed at the entrances with 4-leaf doors which fold against the body end. The vestibule windows are arranged to drop, the center one being fitted with the Brill vestibule sash adjuster, which enables it to be held at any desired height. As the photographs show, the seating arrangement comprises longitudinal corner seats, accommodating four passengers each, and four transverse seats on each side of the aisle. The latter seats are 36 in. long and the aisle is 22 in. wide. As the Brill semi-convertible window system has the window pockets in the roof instead of the side walls, the seats are set against the side lining between the side posts. Therefore, with an outside width over the posts of 8 ft. 2 in., the inside width is 7 ft. 10 in. Brill Winner seats are used, and other items of equipment, such as sand boxes, radial draw bars, gongs, signal bells, etc., are of the same manufacture.

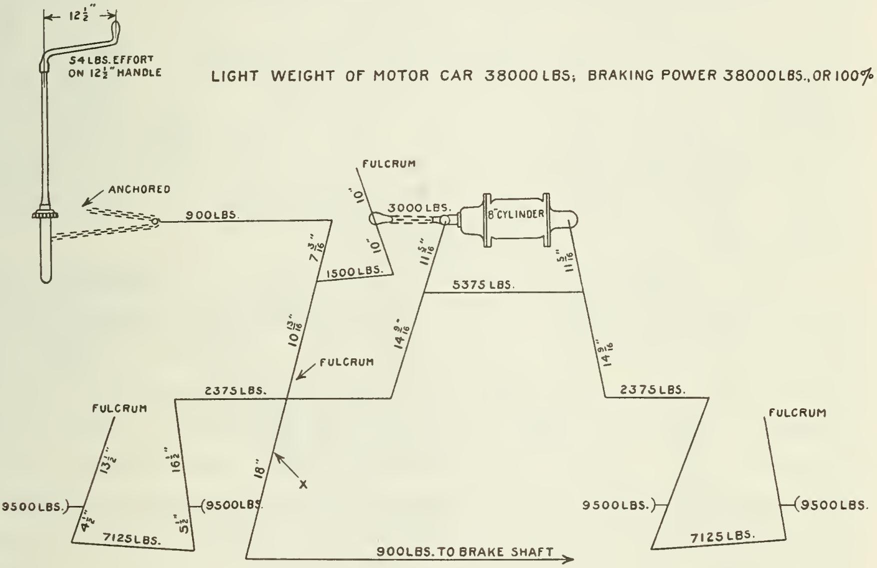
Length of body	20 ft. 8 in.	Type of trucks	Brill No. 21-E
Length over platforms	32 ft. 8 in.	Wheel base	7 ft. 6 in.
Length of platforms	6 ft. 0 in.	Diameter of wheels	33 in.
Centers of side posts	2 ft. 5 in.	Size of journal	3¾ in.
Width over sills	7 ft. 11¼ in.	Type of motors	G.E.-67—2-40 hp.
Width over posts	8 ft. 2 in.	Weight of car body less elec. equipment	13,000 lb.
Height from track to side sills	2 ft. 9½ in.	Wt. of electrical equipment	800 lb.
Track to step	16½ in.	Weight of trucks	6,500 lb.
Step to platform	14½ in.	Weight of motors	4,770 lb.
Platform to floor	6½ in.	Total weight	25,070 lb.
Seating capacity	32		

METHOD OF CALCULATING FOUNDATION BRAKE RIGGING

THE following illustrates our method of calculating the braking power required for applying hand and air brakes to a four-motor car weighing (light) 38,000 lb., the maximum braking power being 100 per cent of the light weight. The example is based on the design of brake rigging in the accompanying diagram, which shows an 8-in. cylinder and the truck brake lever system as used on Brill No. 27-GE1 and No. 27-FE1 trucks.

The light weight of the car being 38,000 lb., the braking power must be the same, which amounts to 4750 lb. per brake shoe and 9500 lb. per brake beam. The force, therefore, delivered at the middle hole of the truck live lever is 9500 lb. The lower pin is the fulcrum; the distance between the fulcrum and the delivered force is 5½ in., and the distance from the fulcrum to the upper pin, where the force is applied, is 22 in.; therefore, the force that must be applied at the upper pin by the pull rod is $\frac{9500 \times 5\frac{1}{2}}{22} = 2375$ lb.

To obtain the force delivered by the live lever, through the bottom brake rod to the truck dead lever, the middle pin becomes the fulcrum, 2375 lb. being the applied force at the upper pin, 16½ in. from the fulcrum, and the delivered force is 5½ in. from the fulcrum; then $\frac{2375 \times 16\frac{1}{2}}{5\frac{1}{2}} = 7125$ lb. This result can be checked by subtracting the force 2375 lb. acting at the upper pin, from the force 9500 lb. acting at the middle pin, which must equal the force at lower pin, or 7125 lb. Note that the dead lever is somewhat shorter than the live lever, being made 18 in. long to meet the design of the truck. The top pin is the fulcrum in this case and a force of 9500 lb. is delivered at the center pin, by means of the force 7500 lb. applied at the bottom pin, which is 18 in. from the fulcrum; therefore $\frac{7125 \times 18}{9500} = 13.5$ in. Hence the middle pin must be located 13½ in. from the upper pin or fulcrum, and 4½ in. from the lower pin.



Assuming that the design of the car makes it convenient to locate the cylinder 26 in. from the center of the car, the length of the cylinder lever would also be 26 in. An 8-in. cylinder with air pressure at 60 lb. per square inch provides a force of 3000 lb. at the push rod end of the cylinder lever, and as the force to be delivered at the pull rod end is 2375 lb., the location of the middle pin of the cylinder lever remains to be determined. Then $\frac{2375 \times 26}{2375 + 3000} = 11.3$ in., say $11^5/_{16}$ in., which would be the distance from the push rod pin to the middle or tie rod pin of the cylinder lever. Similarly, $\frac{3000 \times 26}{3000 + 2375} = 14.511$, say $14^9/_{16}$ in. The check upon these calculations being that the sum of $11^5/_{16}$ in. and $14^9/_{16}$ in. equals 26 in. This completes the calculations from the brake shoes to the push rod of the cylinder.

The multiplying lever is in this case 20 in. long and the middle hole is located 10 in. from the fulcrum. As the force to be delivered to the push rod of the cylinder through the chain connecting the push rod and the multiplying lever is 3000 lb., then the applied force at the pin opposite end of the lever is $\frac{3000 \times 10}{20} = 1500$ lb. Assuming that the design of the car necessitates the lever X being 18 in. long on each side of the center line of the car and that the applied force at the hand-brake rod is 900 lb., then the point of delivery on lever X for the 1500 lb. force will be $\frac{900 \times 18}{1500} = 10.8$ in., or say $10^{13}/_{16}$ in. It will be noted that lever X is the same length on each side of the fulcrum, which enables the 1500 lb. pressure to be applied from either hand-brake shaft, the distance from the fulcrum to the applied force on one side and to the delivered force on the other being the same.

The force on the brake handle necessary to produce 900 lb. on the hand-brake rod is $\frac{900 \times 1\frac{1}{2}}{2 \times 12\frac{1}{2}} = 54$ lb. The 1½ in. dimension, in the last calculation, is the distance from the center of the brake shaft to the center of the brake chain when the latter is wound around the shaft.

THE J. G. BRILL COMPANY

Main Office: PHILADELPHIA, U. S. A.
Cable Address: "BRILL," Philadelphia

London Office: 110 Cannon Street, E. C.
Cable Address: "AXLES," London

American
Car Company
St. Louis, Mo.

G. C. Kuhlman
Car Company
Cleveland, Ohio

John Stephenson Company
Elizabeth, N. J.

Wason
Manufacturing Company
Springfield, Mass.

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49 Rue des Mathurins, Paris
Cable Address: "BOGIBRIL"

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Calle San Martin 201
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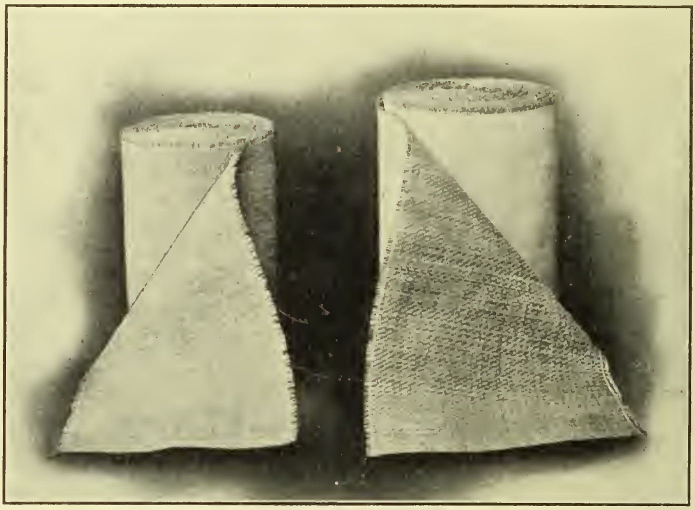

BRILL TWILL WOVEN CANE

The cane used is selected for its hard silicate surface, which doubles the life of the material over that made with ordinary cane. The joints are made by an improved process, absolutely preventing splitting or fraying, and gives the uniform and smooth appearance which characterizes the Brill seating material and this even surface is also due to the close weave obtained by improvements in our looms and processes. Canvas lined woven cane for seat cushions and unlined woven cane for seat backs are made in all widths from 18 to 36 inches. We also furnish leather, imitation leather, plush and other seating materials.

THE J. G. BRILL COMPANY

PHILADELPHIA - - - PENNSYLVANIA

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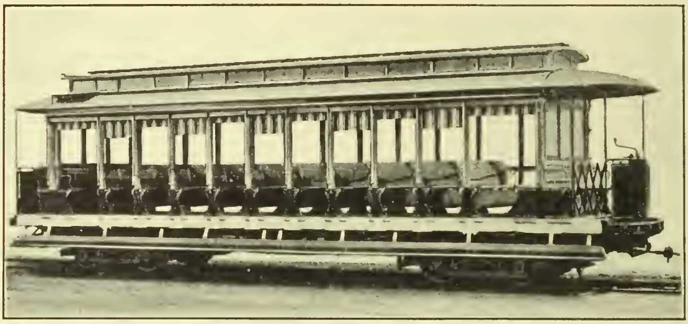
Vol. VI FEBRUARY, 1912 No. 2

BRILL MAGAZINE

Nevski Prospekt
St. Petersburg, Russia



FIFTY "NARRAGANSETT" CARS FOR WASHINGTON, D.C.

The Washington Railway & Electric Company ordered these cars because the receipts show that the open car is the most popular type with its patrons and because the "Narragansett" step arrangement gives the safest and easiest entrance and exit. The cars are to be mounted on Brill No. 39-E single-motor trucks, which will carry them lower than any other type of double-truck. The sill step feature is secured by having the step on the outward-extending flange of a Z-bar sill, bringing the step within the line of the posts and keeping the over-all width of the car the same as in the ordinary type. The Z-bar has also the advantage of strengthening the underframe and by setting the posts in substantial pocket castings gives a support that is unequaled in any other construction. For safety, convenience and superior construction the "Narragansett" is the only open car for mounting on double-trucks which should ever be considered.

THE J. G. BRILL COMPANY

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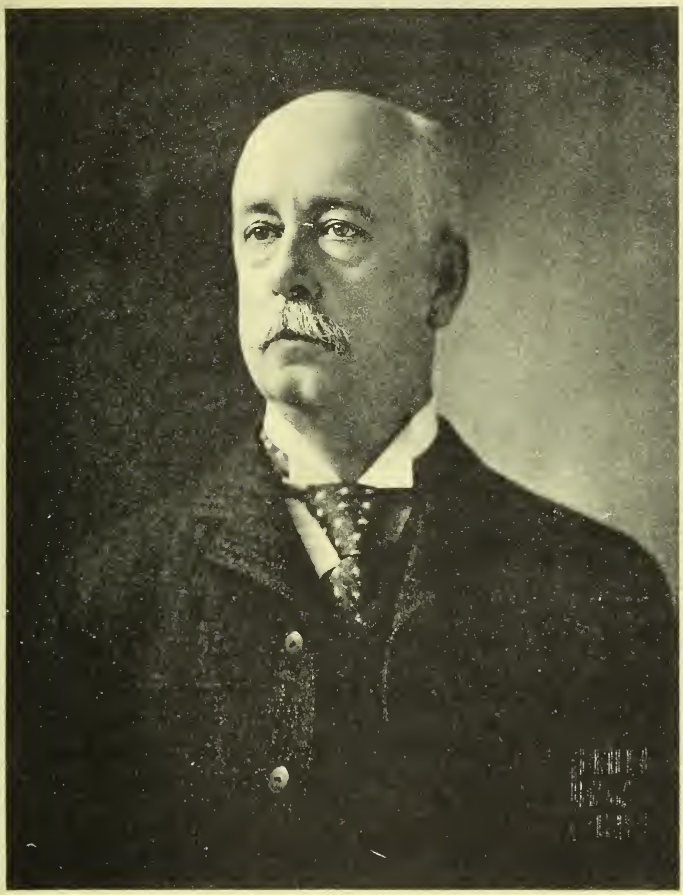

C. S. Mellen

President of the New Haven System

LEMENT TO BRILL MAGAZINE
FEBRUARY 1912

BRILL MAGAZINE

Vol. VI FEBRUARY, 1912 No. 2

C. S. MELLEN

[WITH PORTRAIT INSERT]

CHARLES SANGER MELLEN was born at Lowell, Mass., August 16, 1851. On September 22, 1869, his railroad service began as a clerk in the cashier's office of the Northern New Hampshire Railroad, also serving the Northern Vermont in various clerical capacities until 1880, when he became assistant to the manager of the Boston & Lowell Railroad and rose to be general superintendent. In 1888 he went to the Union Pacific System as general purchasing agent, the next year becoming general traffic manager. Returning to New England in 1892 as general manager of the New York & New England Railroad, he was soon made second vice-president of the New York, New Haven & Hartford. He resigned that position in 1896 to become president of the Northern Pacific, where he remained seven years, during which time the Northern Pacific expanded as few roads have expanded before or since. In 1903 he returned to the New York, New Haven & Hartford as its president. At that time the New Haven System was considerably demoralized and in a precarious condition, but today it holds one of the strongest positions amongst the great systems of the country. In addition to the reorganization, rehabilitation and extension of the system, the electrification of the main line has been carried forward to an extent which places it in advance of all such undertakings, and 1333 miles of street railway lines are operated, of which 700 miles are owned. Mr. Mellen is also president of the Boston & Maine and Maine Central Railroads and of the electric railway systems owned by the New Haven and Boston & Maine systems.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

ST. PETERSBURG*

ST. PETERSBURG, the capital of the Russian Empire, and its principal metropolis, with a population of about 2,000,000, is situated mainly on a peninsula formed by a curve in the River Neva just before it enters the Gulf of Finland. The river subdivides into several branches, forming islands which are ten or eleven feet above the average level of the gulf. A ship canal, with a harbor capable of accommodating 50 seagoing ships, makes the city a seaport. For nearly five months of the year the river is frozen to a depth of two or three feet. The larger part of the city is located on the left bank of the river and includes the best streets, bazaars, markets, the palaces, cathedrals and theaters, and all the railway stations except that of the Finland Railway. A granite embankment extends along the river at this part and is bordered by palaces and large private houses. Midway of the embankment, behind a line of fine houses, stands the Admiralty, the very center of the capital, surrounded by a broad square on three sides. On one side is the monument to Peter the Great, backed by the Cathedral of St. Isaac, and on the other side are the Minister of War and the Imperial Winter Palace, the latter of huge dimensions. The topopraphy of the city is simple: three long streets, the main arteries, radiate from the Admiralty and are intersected by three girdles of canals, with which a number of streets run parallel. The Prospekt Nevski, shown on the cover of this issue, is a broad street extending from the Admiralty to the Moscow Railway station and on to the Neva. It is the principal shopping thoroughfare and always presents an animated scene. The

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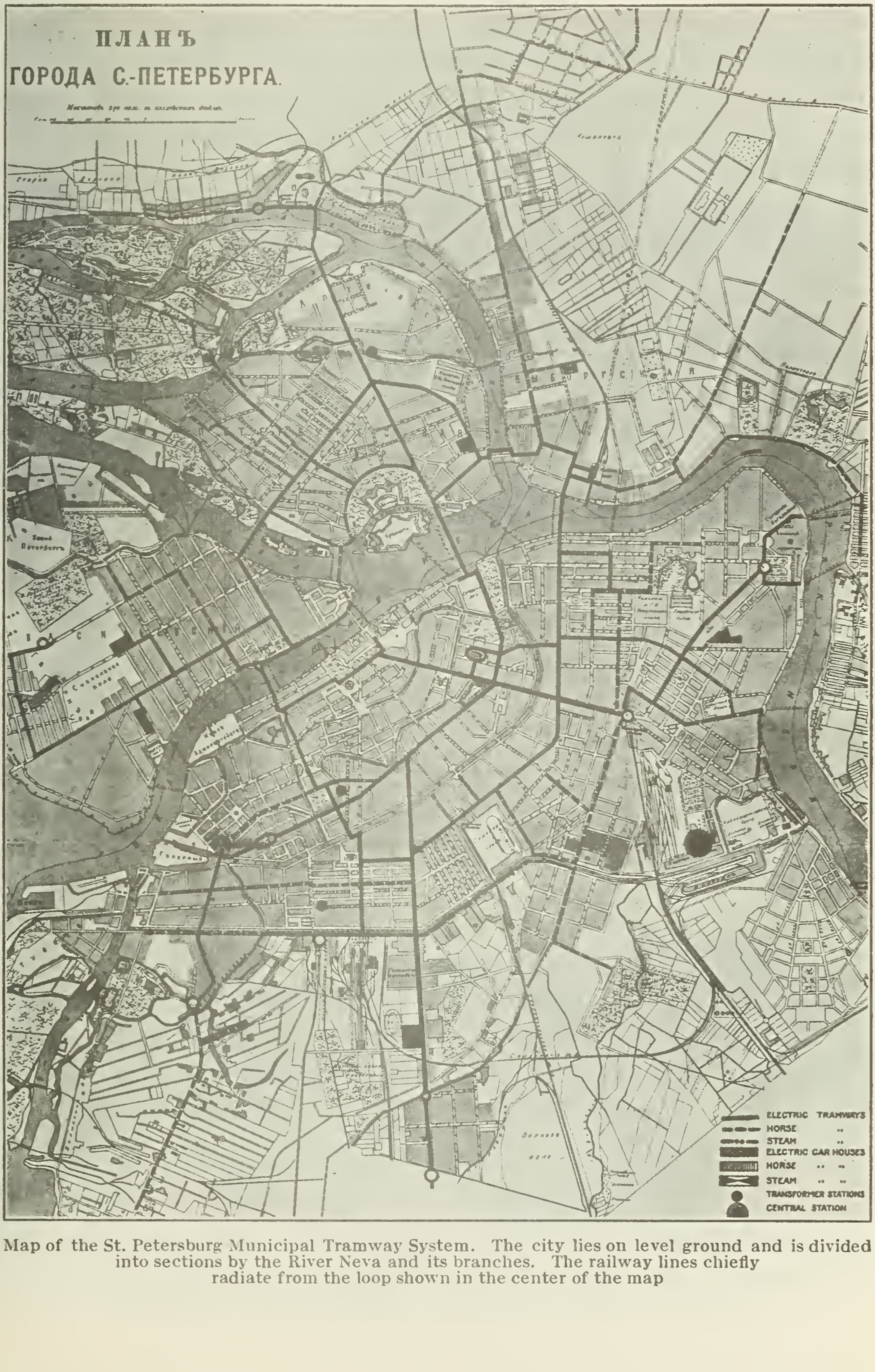
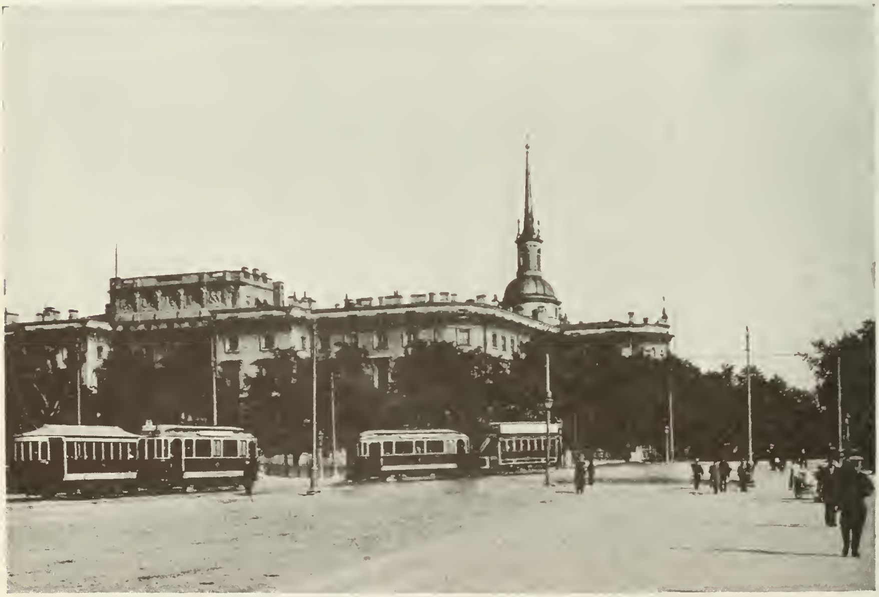
* The thirty-eighth article of the series.



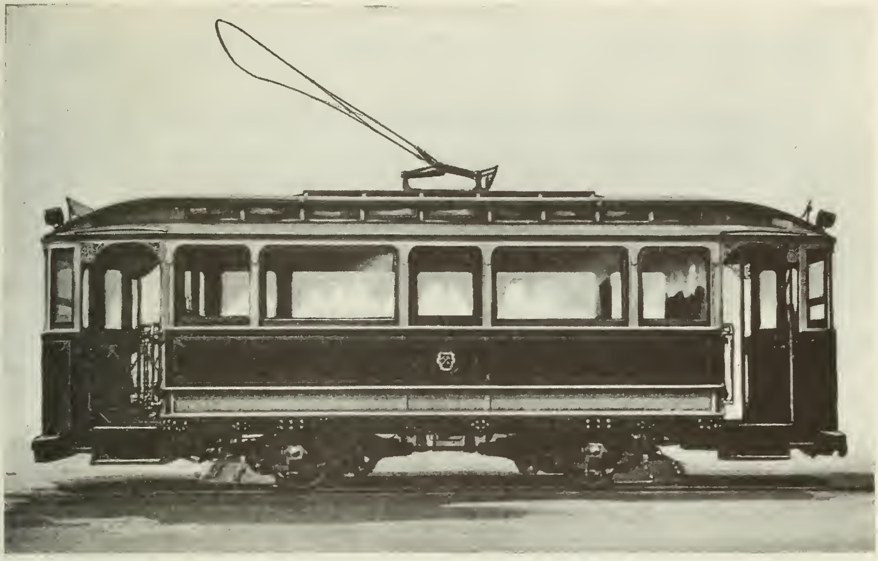
Map of the St. Petersburg Municipal Tramway System. The city lies on level ground and is divided into sections by the River Neva and its branches. The railway lines chiefly radiate from the loop shown in the center of the map center of commercial activity is at the eastern end of Vasilyevski Island. The stock exchange and the quays and storehouses are in this section, and on the rest of the island, facing the Neva, are scientific and educational institutions. The fortress of St. Peter and St. Paul, now a state prison, occupies another of the islands, while still others have a great botanical garden, public gardens and parks, and summer residences. They are also covered in part with dwellings.

The industries of St. Petersburg include the manufacture of cottons and other textiles, metal and machinery works, tobacco, paper and soap factories, breweries, distilleries, sugar refineries, shipbuilding yards, printing works, potteries, carriage works, etc. The growth in diversified manufactures is progressing rapidly.

Six railways radiate from the city, and the river is an important channel of trade, connecting a large part of the empire with the capital by means of the Volga and its tributaries.



ST. PETERSBURG MUNICIPAL TRAMWAYS. The motor cars are largely operated with trailers. Double-deck and single-deck trailer cars are shown in the photograph. Military Engineering Administration Building in the background



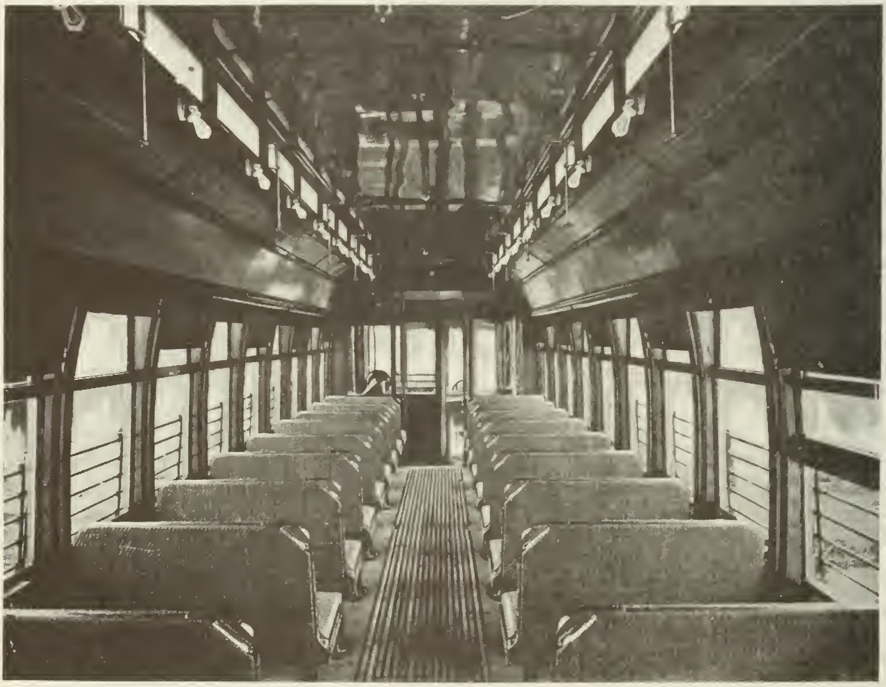
St. Petersburg Municipal Tramways. The standard motor car of the system weighs about 12 tons and seats 24 passengers. Eight passengers are permitted to stand on each platform

The street railway lines of St. Petersburg were transferred from British ownership to the municipality in 1907, and in that year electrification of the system was commenced and has progressed to the extent that there are now 385 motor cars and 183 trailers, of which 340 motor cars and 170 trailers are in daily service. The motor cars weigh about 12 tons and provide seating places for 24 passengers inside, and 16 standing passengers can be accommodated on the platforms. Trailer cars of both single- and double-deck types are used. The motor trucks are of the radial single-axle design, known as the Nuremberg type, in which the weight of the car body is taken on segmental plates and the pivotal point over the center of the axle. The maximum speed is 16 miles per hour, including stops. The cars are in operation for 16 hours per day and the average car duty is 80 miles per car per day. Three-phase current at 6600 volts, 25 periods, is generated at the central power station and is delivered by an underground cable to sub-stations, where it is transformed by means of rotary converters and used at 600 volts.

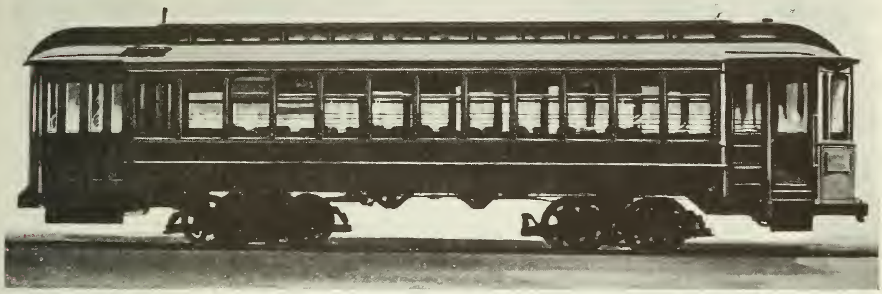
MORE SEMI-CONVERTIBLE CARS FOR ROCHESTER, N. Y.

SINGLE-END P-A-Y-E TYPE

FIFTEEN single-end cars have been delivered to the New York State Railways for the Rochester lines by the G. C. Kuhlman Car Company, which conform in general design and appearance to the company's standard and are similar to a lot of 25 cars which were the subject of an article in BRILL MAGAZINE of the issue of May, 1910. At the forward end of the new cars the bulkhead is omitted, the rear platform step folds in conjunction with the doors, the lower parts of the doors are fitted with clear wire glass, channel iron

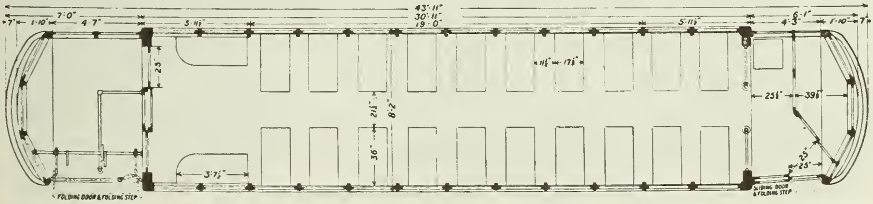


CARS FOR ROCHESTER. These cars differ from the last lot furnished, particularly in the omission of the forward bulkhead and in the rear vestibule door and step arrangement



CARS FOR ROCHESTER. The front door is hinged to the vestibule corner post and is operated in conjunction with the step from the motorman's position. The rear doors at the entrance and exit are independently operated and the lower parts of the doors are fitted with clear wire glass. The cars were photographed on temporary trucks; all were mounted on Brill No. 27-FE1 trucks

needle beams and several other items are features of this last lot of cars. The side sills are 5 by 8 in., reinforced on the inside with 15 by ⅜-in steel. The end sills are of white oak 5¼ by 8 in., reinforced by 9 by ½-in. steel plates on the inside; the cross joists are also of white oak 3½ by 6¼ in., except those which have tie rods between, and being double, are 1¾ by 6¼ in.; the framing is braced at the center with 1¾ by 4-in. diagonal members. Each corner of the bottom framing is reinforced with 8 by ¾-in. steel plate, extending beyond the platform and well toward the center of the car. The side posts are ¾ in. thick; deck rafters, ⅞ by 1¾ in.; steel carlines, 1½ by ⅜ in., are sandwiched between the wooden rafters. The hoods are removable. The sashes at the ends and sides of both vestibules are arranged to drop into pockets. All the side windows, as well as those of the vesti-



CARS FOR ROCHESTER. These cars are designed for single-end operation. Seating capacity, 44. The mechanism for operating the rear doors is indicated bules, have the sashes framed with brass stiles and cherry rails. Cherry is used for the interior finish and is slightly stained to insure uniform color. The upper headlining is of Gardner board, 3/16 in. thick, and made in three sections; the side roof linings are of ¼-in. Galco board. Signal bells on both platforms are rung at the same time when a button, which is located on each side of the posts, is pressed.

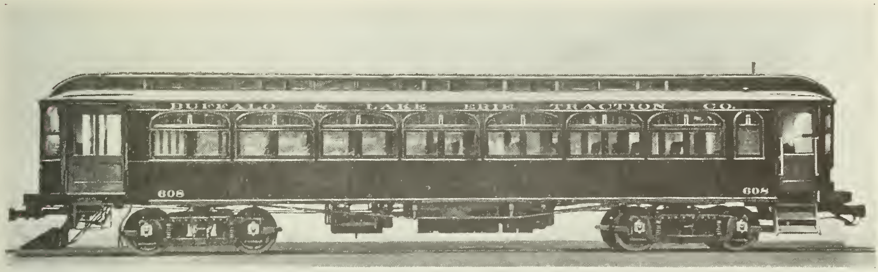
Length of body	30 ft. 11 in.	Step to platform	14½ in.
Length over platforms	43 ft. 5 in.	Platform to floor	9 in.
Length of front platform	6 ft. 1 in.	Seating capacity	44
Length of rear platform	6 ft. 5 in.	Type of trucks	Brill No. 27-FE1
Centers of side posts	2 ft. 6 in.	Wheel base	4 ft. 6 in.
Width over sills	8 ft. 1 in.	Diameter of wheels	33 in.
Width over posts	8 ft. 3 in.	Type of motors	G.E.-219—4-40 hp.
Extreme width	8 ft. 6¼ in.	Weight of car body	20,480 lb.
From track to sills	2 ft. 8 5/16 in.	Wt. of motors and electrical equipment	13,070 lb.
From side sills over trolley boards	9 ft. 0 5/16 in.	Wt. of air-brake equipment	1,500 lb.
From floor to headlining	8 ft. 1 5/16 in.	Weight of trucks	14,240 lb.
Track to step	15⅝ in.	Total weight	49,290 lb.

INTERURBAN CARS FOR BUFFALO & LAKE ERIE TRACTION

BRILL No. 27-M.C.B.2 TRUCKS

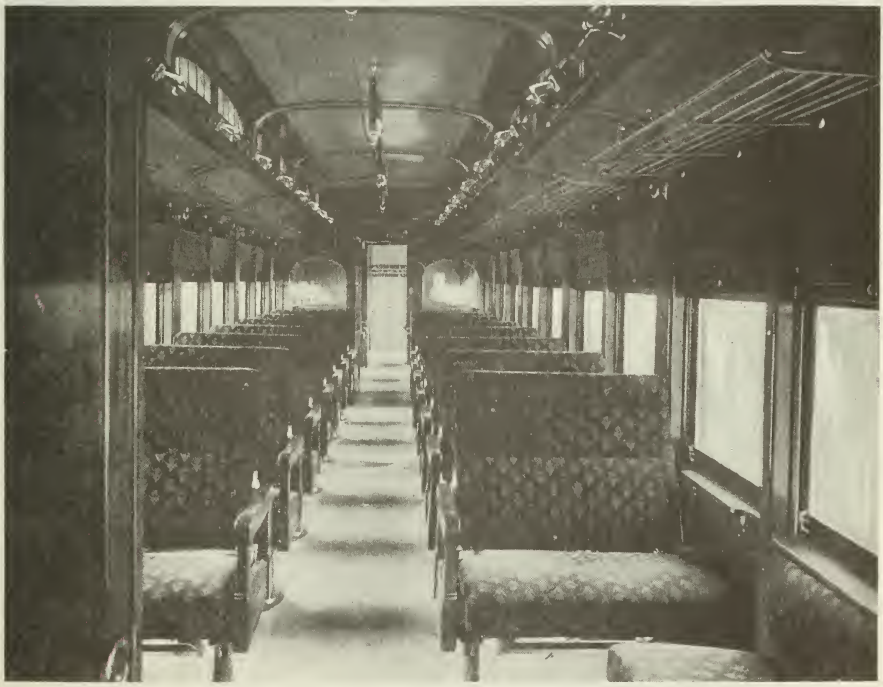
FOUR handsome cars of the type illustrated have been delivered to the Buffalo & Lake Erie Traction Company by the G. C. Kuhlman Car Company for use in both local and limited service on the 46-mile division between Buffalo and Fredonia. The local service between these points is 2 hours and 15 minutes, and the limited cars make the distance in 1 hour and 50 minutes. Three or four round trips per day are made by each car in local service, depending upon the runs to which they are assigned.

The bottom framing of the cars consists of 30 by 5/16 in. steel plates, reinforced with angles at top and bottom, the

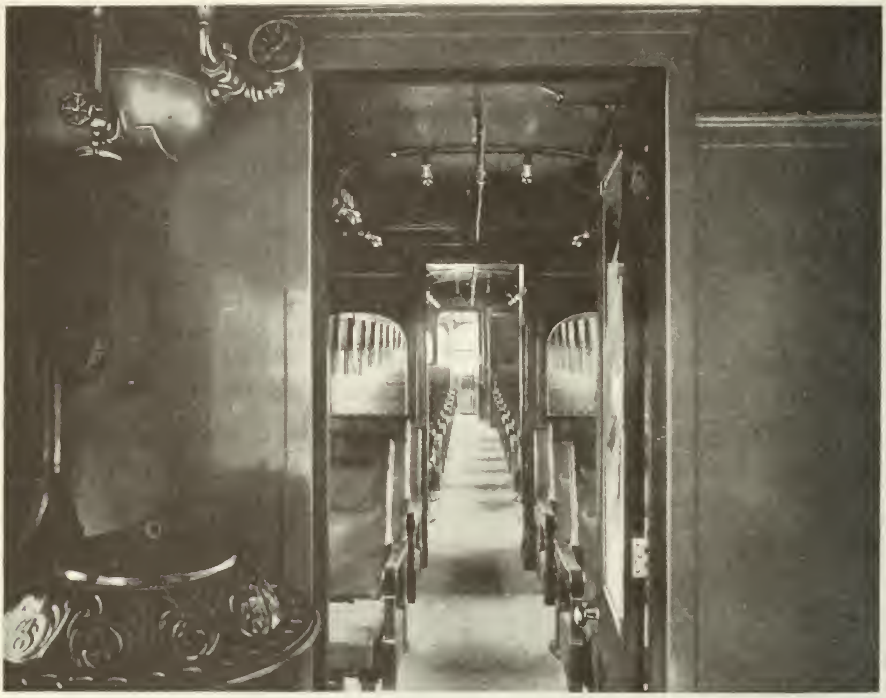


CARS FOR BUFFALO & LAKE ERIE TRACTION. These cars were built at the Kuhlman plant and are now in service between Buffalo and Fredonia. Mounted on Brill No. 27-M.C.B.2 trucks

bottom angle being 7 by 3½ by ½ in.; long leaf yellow pine side sills 5½ by 7¹¹/₁₆ in.; the center sills are 6-in. I-beams with pine fillers, and the intermediate sills are of pine 3¾ by 6⅞ in. The interiors are plainly finished in selected Philippine mahogany and are furnished with seats of the Brill "Winner" type. The cars are mounted on Brill No. 27-



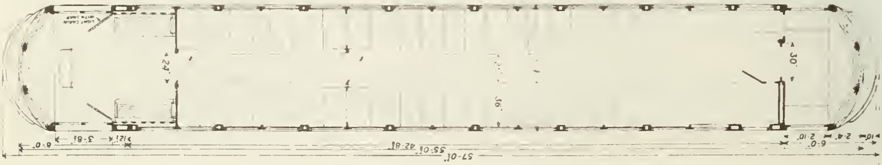
CARS FOR BUFFALO & LAKE ERIE TRACTION. The interior of the cars is plainly but richly finished in Philippine mahogany, and with the semi-empire dome and art glass in the arched-top side and deck sashes presents a very attractive appearance



Cars for Buffalo & Lake Erie Traction. The baggage compartment has sliding doors on each side and folding seats. The motorman's position is protected by a light railing which extends to the ceiling and has a curtain which draws to the floor

M.C.B.2 trucks, which are equipped with G.E.-205 commutating pole motors with multiple-unit control and Westinghouse straight and automatic air equipment.

Length of body	42 ft. 8⅞ in.	From side sills over trolley boards	8 ft. 11⅞ in.
Length over platforms	55 ft. 0⅞ in.	From track to step	17⅛ in.
Length of rear platform	5 ft. 2 in.	Risers	11⅛ in.
Length of baggage comp.	9 ft. 7 in.	Seating capacity	60
Length of smoking comp.	11 ft. 1 in.	Type of trucks	Brill No. 27-M.C.B.2
Centers of side posts	2 ft. 7 in.	Wheel base	7 ft. 0 in.
Width over sills	8 ft. 4 in.	Diameter of wheels	37 in.
Extreme width	8 ft. 7 in.	Type of motors	G.E. 205—4-90 hp.
From track to side sills	3 ft. 6 in.		



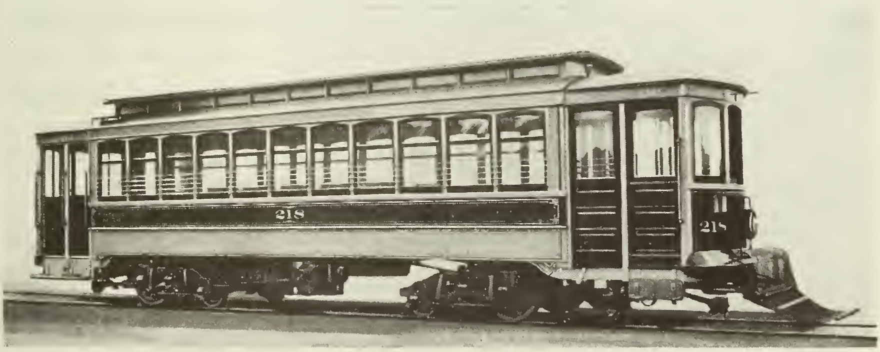
Cars for Buffalo & Lake Erie Traction. The cars are designed for single-end operation, with entrances at both sides of the rear platform. Seating capacity, 60

TWENTY PREPAYMENT CARS FOR DES MOINES, IOWA

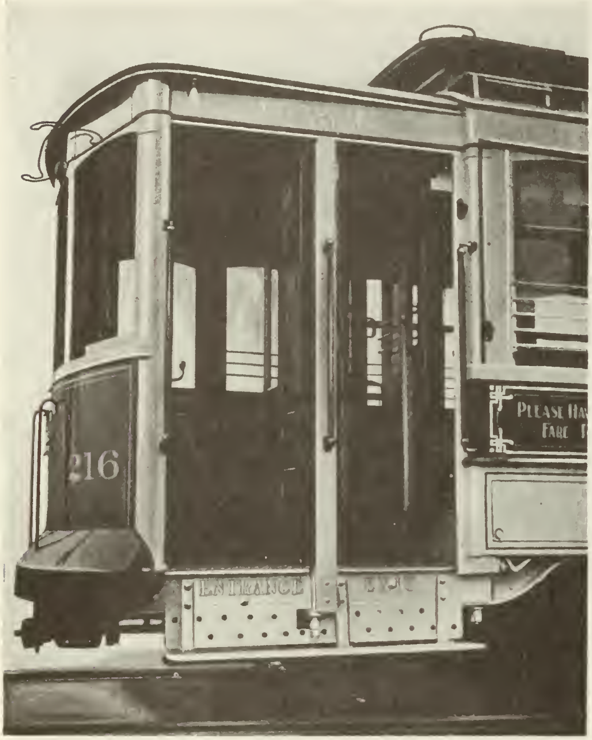
BRILL No. 39-E TRUCKS

AMONG the extensive improvements which the Des Moines City Railway Company has instituted recently was the addition of 20 cars furnished by the American Car Company which are the first of the prepayment type to be used on the system. An interesting item in connection with the shipment of these cars is that the first two shipments of five cars which left St. Louis at 5 p. m., were delivered in Des Moines, 370 miles away, at 5 p. m. the next day and were placed in service at 2 p. m. on the day following; therefore, they were in service within 45 hours after they left the shops of the American Car Company. They were put in service on the lines where the traffic is heaviest, during the rush hours each car carrying from 90 to 100 passengers.

The bottom framing of the new cars includes side sills of long leaf yellow pine, 4 by 7¾ in. with 15 by ⅜-in. plates on the inside; the end sills of white oak are 5¼ by 7¾ in. and center cross joists 2¼ by 4 in. The body framing consists of



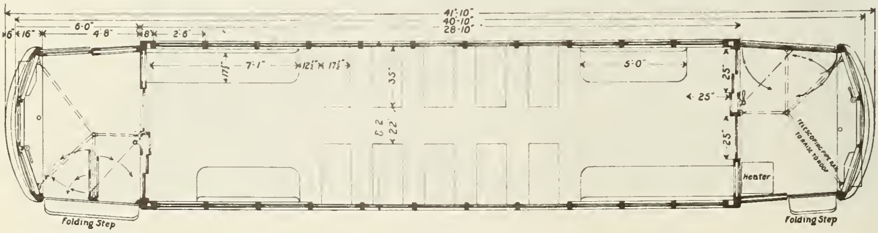
Cars for Des Moines. The cars are mounted on Brill No. 62-E single-motor trucks which are identical to the Brill No. 39-E type, except that the brake rigging is arranged to permit the small wheels to be toward the center of the car



CARS FOR DES MOINES. The two-part entrance door is hinged to the center post and operates in conjunction with the step by a handle which is shown in the diagram below; the exit door is not connected with the mechanism and is opened and closed by hand

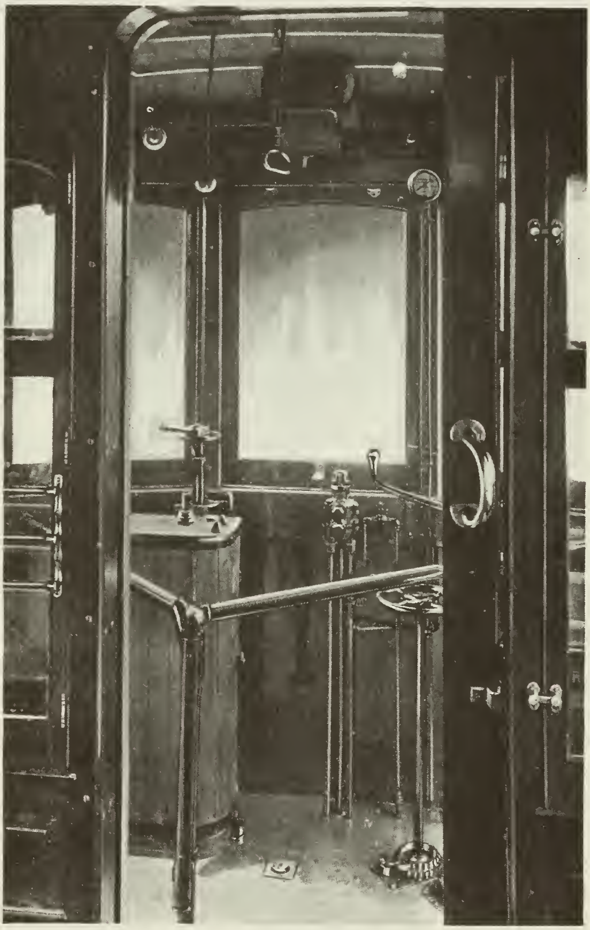
corner posts 3⅝ in. thick and side posts 2¼ in. thick; sweep of posts 1½ in. The interiors are finished in cherry, with ceilings of Agosite. Five transverse seats on each side of the aisle, of the Brill "Winner" type, and four longitudinal seats, give seating accommodation for 40 passengers. Push buttons are placed on each of the side posts out of reach of children. The pay-as-you-enter platform railing is arranged to enclose the motorman and with the other platform arrangements will be understood by referring to the diagram.

It will be seen that the pay-as-you-enter railing consists

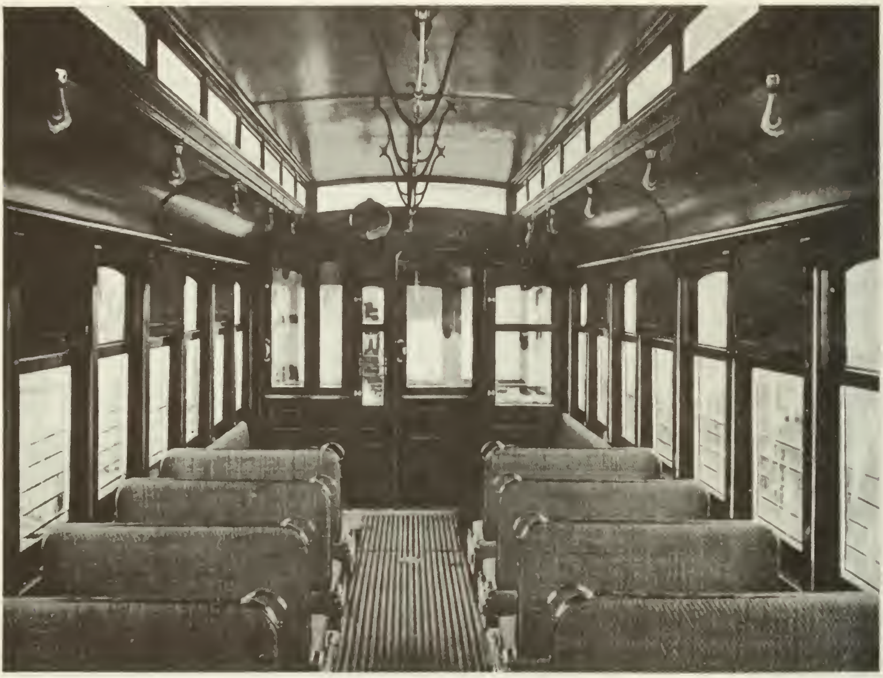


CARS FOR DES MOINES. The dotted lines on the platform indicate the moveable railings which are arranged to enclose the motorman's position and shown in the engraving on the following page of three horizontal sections, each having a telescoping end to engage in sockets; all are pivoted or hinged to the center upright. In arranging the pipes to enclose the motorman's position, the longer pipe is let down from a vertical position, the pipe which extends to the vestibule door post is swung around and latched just inside the vestibule corner post and the short railing is dropped; thus the platform is cleared of the railings and a large space provided for standing passengers.

It will also be seen on the diagram that the handle for operating the entrance door is at the narrow bulkhead which supports the body end doors and operates only the entrance door; the exit door is opened and closed by hand. The step which serves both the entrance and exit doors is operated in conjunction with the entrance door. In order to obtain as much space as possible on the platform for on-coming passengers and also to the corner, the doors in the



Cars for Des Moines. The railing is shown surrounding the motorman's position. The horizontal railing, extending to the right, raises to the roof. The diagram on the preceding page explains the arrangement



CARS FOR DES MOINES. Exit door in the body end is of the double sliding type with a shallow pocket, while the entrance door is single. Seating capacity of the cars, 40

body end are arranged in a very practical manner, the exit door being of the telescoping type; this exit door and its pocket do not extend half way across the car, yet give ample space for the conductor's railing to enclose his position and for the hinged exit door to swing back against the railing.

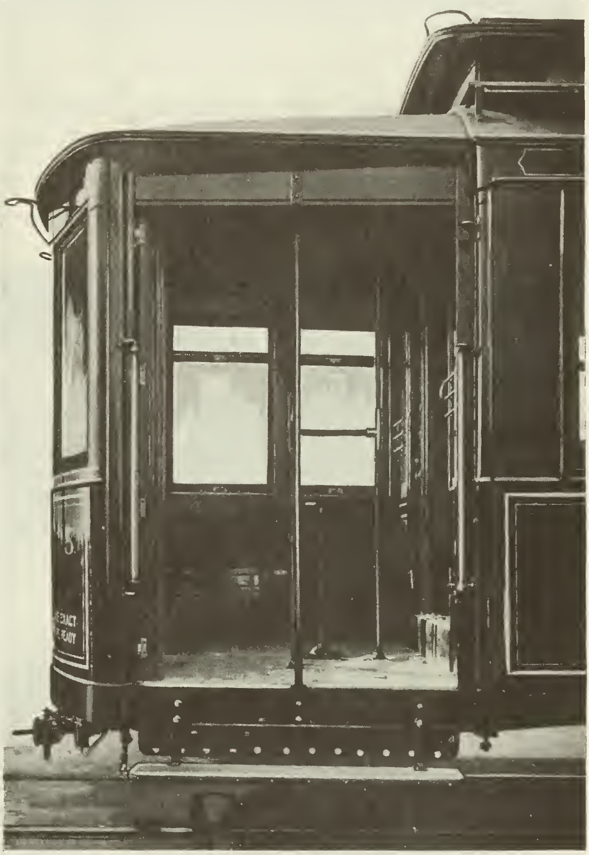
Following are the principal dimensions and weights:

Length of body	28 ft. 10 in.	Track to step	$16\frac{13}{16}$ in.
Length over platforms	40 ft. 10 in.	Step to platform	14 in.
Length of platforms	6 ft. 0 in.	Platform to floor	9⅝ in.
Centers of side posts	2 ft. 6 in.	Type of trucks	Brill No. 39-E
Width over sills	8 ft. 0 in.	Wheel base	4 ft. 6 in.
Width over posts	8 ft. 2 in.	Diameter of wheels	33 and 21 in.
Extreme width	8 ft. 4¼ in.	Type of motors	G.E.-98—2
From track to side sills	2 ft. $8\frac{11}{16}$ in.	Wt. of car body less electrical equipment	17,000 lbs.
From side sills over trolley boards	9 ft. 4¼ in.	Weight of trucks	9,840 lbs.
From floor to headlining	8 ft. 1¾ in.		

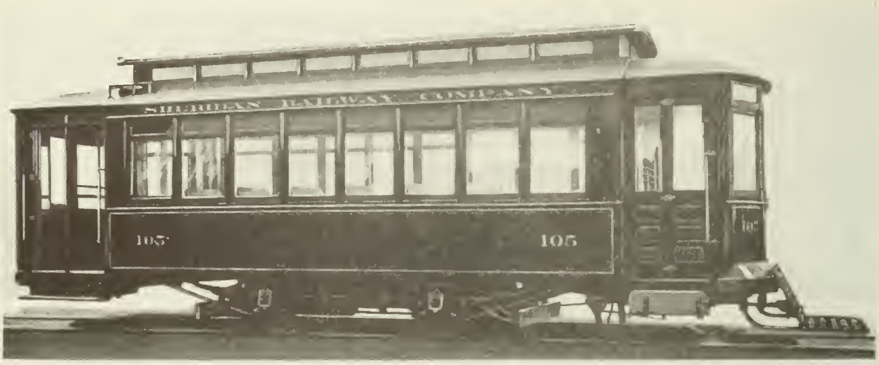
CARS FOR SHERIDAN, WYOMING

CITY AND INTERURBAN TYPES

THE American Car Company has delivered to the Sheridan Railway & Light Company three single-truck cars for use on the city system at Sheridan, and two passenger and baggage cars to the Sheridan Interurban Railway for service on the lines extending southward to Fort Mackenzie and beyond. The shorter cars are of the prepayment type and have the entrance and exit at one side only, the other side of the vestibules being solidly paneled. Two of the cars are operated by one man. As the cars are designed for single-end operation, with the one-man crew they are operated in the reverse direction and have the door of the shorter platform locked. A fare box is used on

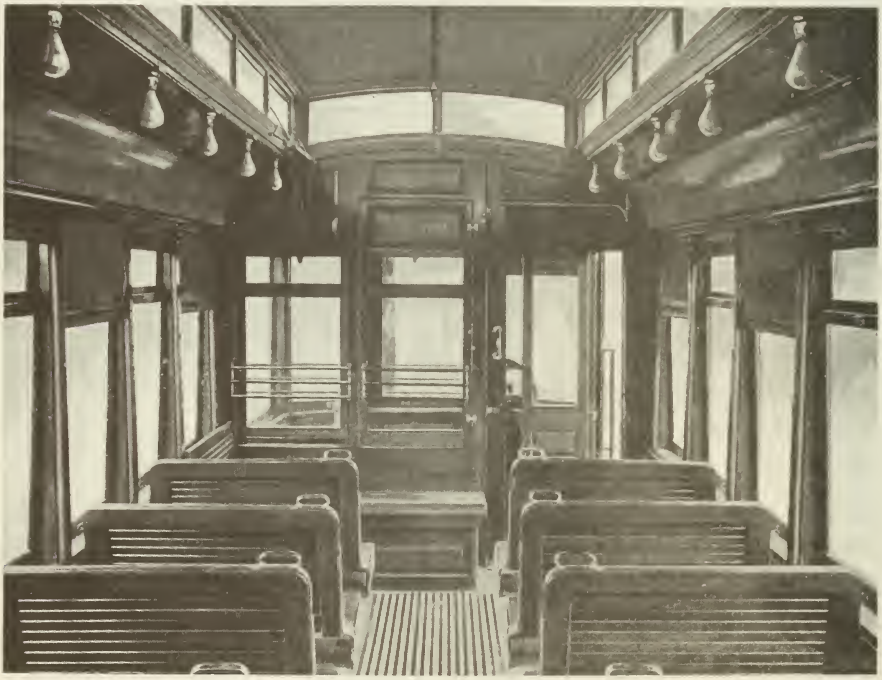


Cars for Sheridan. Double sliding doors in the rear body end provide entrance and exit which is divided by an upright pipe with pay-as-you-enter railing connected thereto and brought around to the pipe or stanchion at the center of the step opening. The four-leaf folding door is hinged to the vestibule corner post and the operating mechanism is connected to the folding step



Cars for Sheridan. Some of these cars, although designed for single-end operation, are being used as one-man prepayment cars and operated in the reverse direction, with the entrance door on the shorter platform locked. Brill No. 21-E truck

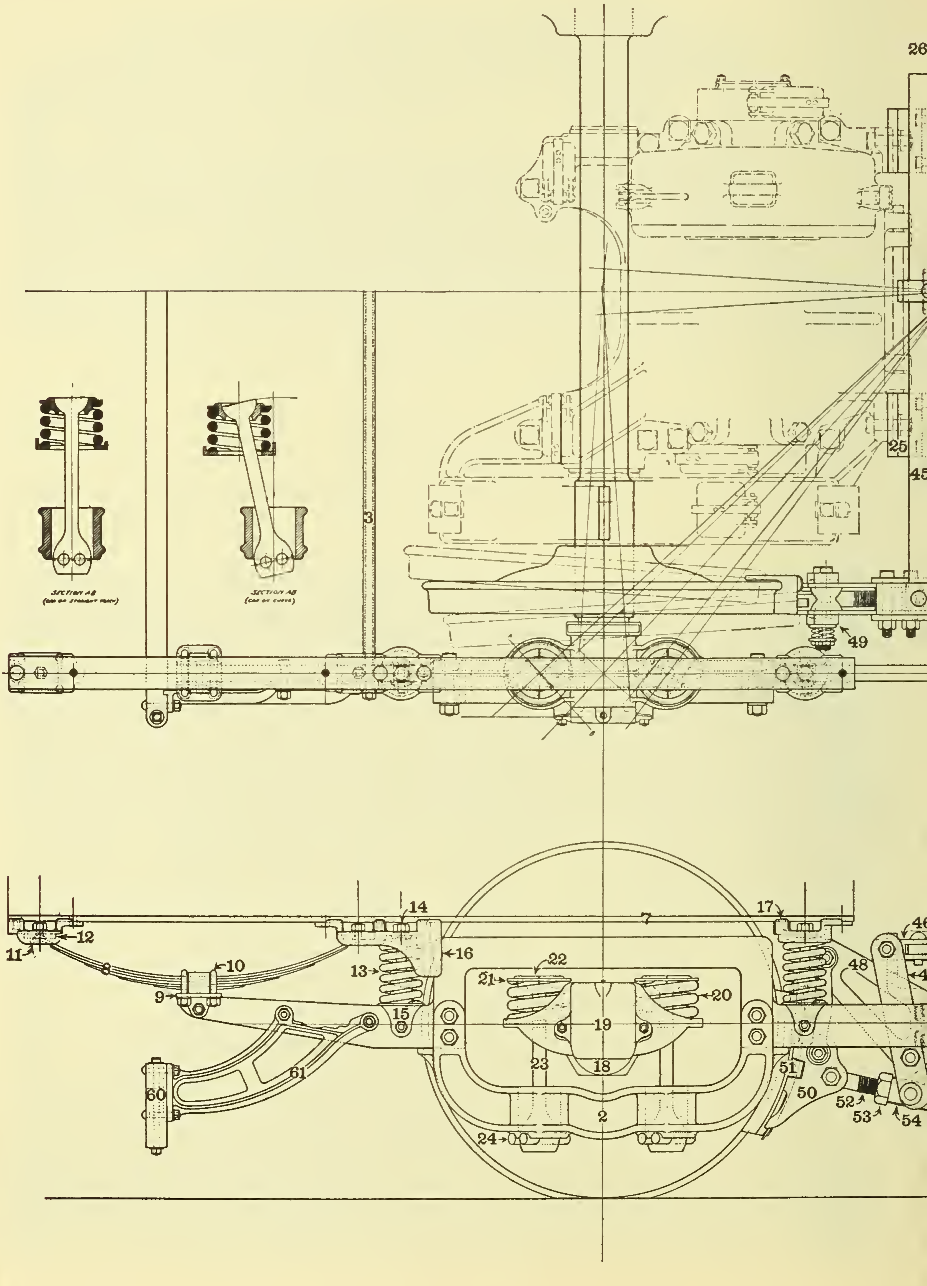
the railing, and the company reports that this method is entirely satisfactory. As the seats have stationary backs, those of the cars operated by one man were made to face the longer platform. Later on, it is intended to run the cars



Cars for Sheridan. The interiors are finished in cherry with slat seats of the same. Seating capacity, 31

BRILL "RADIAX"

(PATENTED)



Form 515

SUPPLEMENT T

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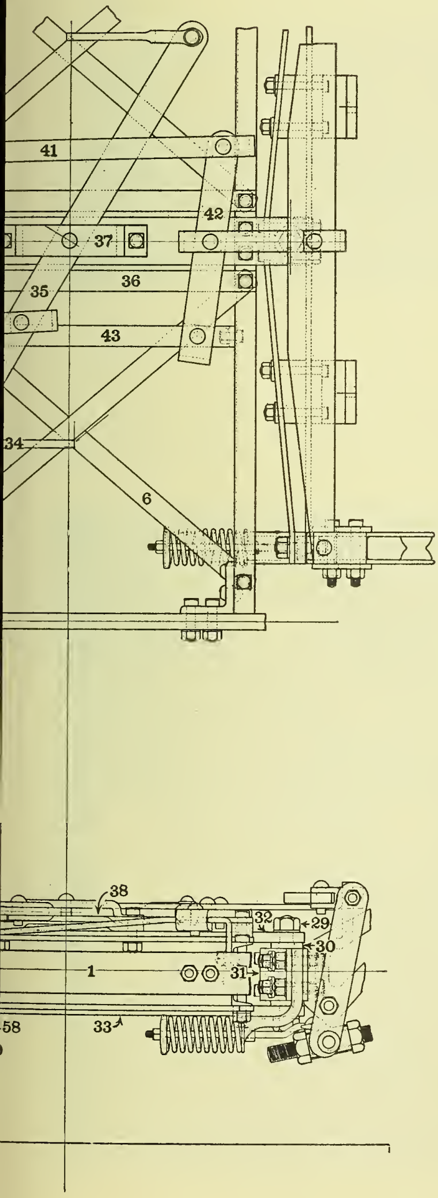
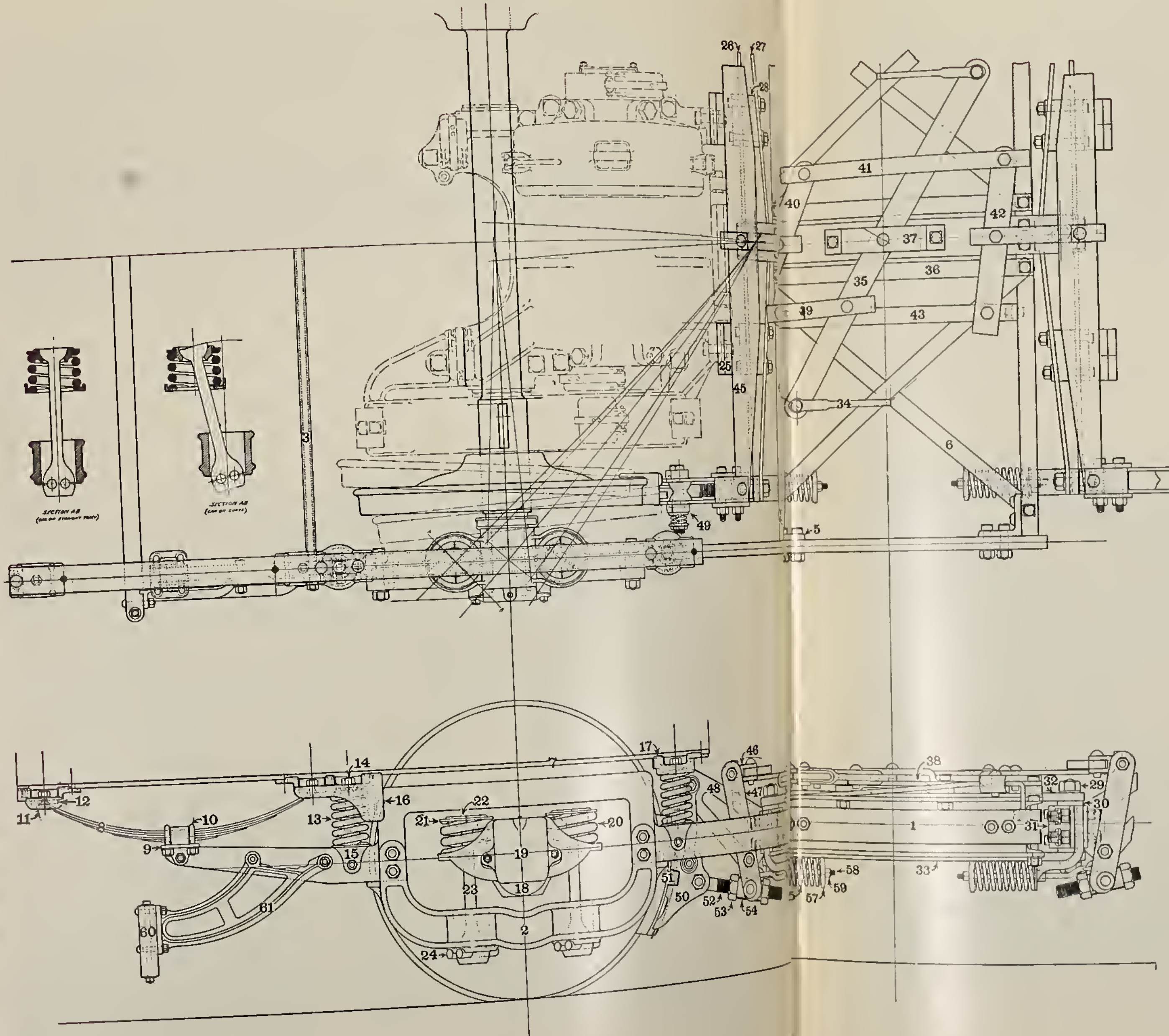


Names of Parts

1 Side Frame
2 Yoke Brace
3 End Frame
4 Cross Bar
5 Cross Bar Corner Bracket
6 Cross Bar Brace
7 Top Chord
8 Body End Spring (semi-elliptic)
9 Body End Spring Seat
10 Body End Spring U-bolt
11 Body End Spring Cap
12 Body End Spring Wear Plate
13 Body Spring (coil)
14 Body Spring Bolt
15 Body Spring Seat
16 Thrust Piece
17 Body Spring Cap
18 Journal Box
19 Journal Box Lid
20 Journal Box Spring
21 Journal Box Spring Cap
22 Swing Link Socket
23 Swing Link
24 Swing Link Pin
25 Motor Suspension Bracket
26 Motor Suspension Bracket Support, Straight
27 Motor Suspension Bracket Support, Arched
28 Motor Suspension Bracket Support Filling Piece
29 King Bolt
30 King Bolt Casting, top
31 King Bolt Casting, bottom
32 King Bolt Support, top
33 King Bolt Support, bottom
34 Brake Rod
35 Center Lever
36 Center Lever Slide
37 Center Lever Fulcrum, top
38 Center Lever Fulcrum, bottom
39 Center Lever Connection
40 Live Lever
41 Lever Connection
42 Dead Lever
43 Dead Lever Fulcrum
44 Top Truck Connection
45 Equalizing Beam
46 Clevis
47 Upright Lever
48 Brake Hanger Carrier
49 Brake Hanger, "Half Ball"
50 Brake Head
51 Brake Shoe
52 Bottom Truck Connection
53 Bottom Truck Connection Jam Nut
54 Bottom Truck Connection Casting
55 Release Spring
56 Release Spring Bracket
57 Release Spring Cap
58 Release Spring Hook Bolt
59 Release Spring Hook Bolt Nut
60 Wheelguard
61 Wheelguard Bracket

BRILL "RADIAX" TRUCK

(PATENTED)

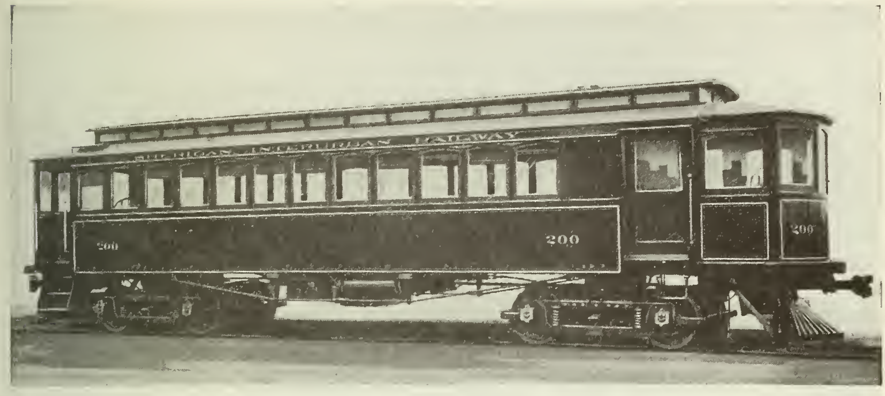


Names of Parts

1 Side Frame
2 Yoke Brace
3 End Frame
4 Cross Bar
5 Cross Bar Corner Bracket
6 Cross Bar Brace
7 Top Chord
8 Body End Spring (semi-elliptic)
9 Body End Spring Seat
10 Body End Spring U-bolt
11 Body End Spring Cap
12 Body End Spring Wear Plate
13 Body Spring (coil)
14 Body Spring Bolt
15 Body Spring Seat
16 Thrust Piece
17 Body Spring Cap
18 Journal Box
19 Journal Box Lid
20 Journal Box Spring
21 Journal Box Spring Cap
22 Swing Link Socket
23 Swing Link
24 Swing Link Pin
25 Motor Suspension Bracket
26 Motor Suspension Bracket Support, Straight
27 Motor Suspension Bracket Support, Arched
28 Motor Suspension Bracket Support Filling Piece
29 King Bolt
30 King Bolt Casting, top
31 King Bolt Casting, bottom
32 King Bolt Support, top
33 King Bolt Support, bottom
34 Brake Rod
35 Center Lever
36 Center Lever Slide
37 Center Lever Fulcrum, top
38 Center Lever Fulcrum, bottom
39 Center Lever Connection
40 Live Lever
41 Lever Connection
42 Dead Lever
43 Dead Lever Fulcrum
44 Top Truck Connection
45 Equalizing Beam
46 Clevis
47 Upright Lever
48 Brake Hanger Carrier
49 Brake Hanger, "Half Ball"
50 Brake Head
51 Brake Shoe
52 Bottom Truck Connection
53 Bottom Truck Connection Jam Nut
54 Bottom Truck Connection Casting
55 Release Spring
56 Release Spring Bracket
57 Release Spring Cap
58 Release Spring Hook Bolt
59 Release Spring Hook Bolt Nut
60 Wheelguard
61 Wheelguard Bracket

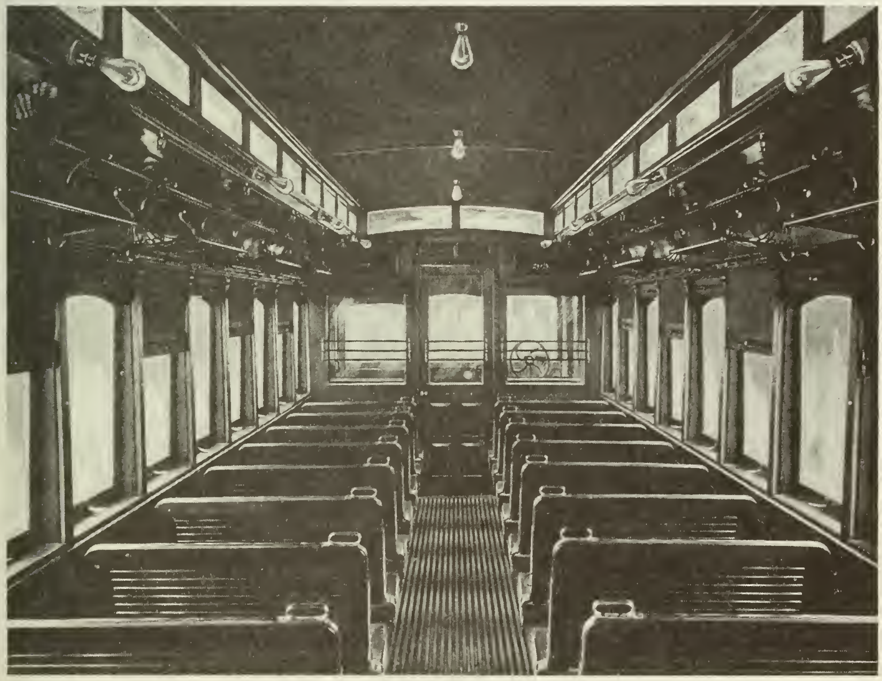
SUPPLEMENT TO BR AGAZINE, FEBRUARY, 1912

Form 515

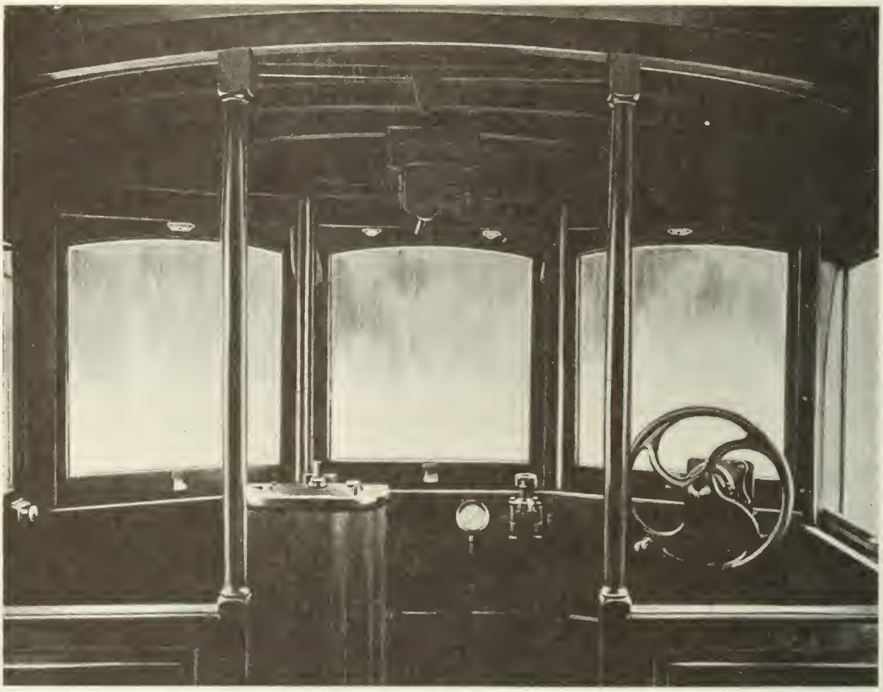


CARS FOR SHERIDAN. The cars have entrances at diagonal corners and are equipped with controlling apparatus at both ends but are normally operated at the baggage compartment end

with conductors and change the seats to face the shorter platform and operate in the direction for which the cars were designed. The interurban passenger and baggage cars



CARS FOR SHERIDAN. The interiors are plainly finished and well suited to the pioneer service of this new railway system. Seating capacity, 52



CARS FOR SHERIDAN. The forward end of the baggage compartment. The light wooden partition is provided with a curtain which can be drawn to the floor

are equipped for double-end operation, although they will normally be operated at one end, and therefore the seats are furnished with stationary backs; the baggage compartment has folding seats for the use of smokers. Both the city and interurban cars are of a rugged and plain construction admirably suited to the development of traffic on this new railway system.

Following are the principal dimensions of the city cars:

Length of body	21 ft. 0 in.	From floor to headlining	7 ft. 3½ in.
Length over platforms	31 ft. 6 in.	From track to step	$14\frac{3}{16}$ in.
Length of front platform	4 ft. 0 in.	From step to platform	13 in.
Length of rear platform	6 ft. 0 in.	From platform to floor	7¼ in.
Centers of side posts	28¼ in.	Seating capacity	31
Width over sills	7 ft. 11 in.	Type of truck	Brill No. 21-E
Width over posts	7 ft. 11 in.	Wheel base	7 ft. 0 in.
Extreme width	8 ft. 2 in.	Diameter of wheels	33 in.
From track to sills	26⅝ in.	Type of motors	G.E..216—2-50 hp.
From sills over trolley boards	9 ft. 6 in.		

Following are the principal dimensions of the passenger and baggage cars:

Length of body	37 ft. 1 in.	From sills over trolley boards	9 ft. 3½ in.
Length over vestibules	46 ft. 8 in.	From floor to headlining	7 ft. 0 5/16 in.
Length of rear platform	4 ft. 9¼ in.	From track to step	16 3/16 in.
Length of baggage comp.	10 ft. 11 in.	Three steps, each	11¼ in.
Length of passenger comp.	30 ft. 11½ in.	Seating capacity	52
Centers of side posts	30½ in.	Type of trucks	Brill No. 27-M.C.B.1
Width over sills	8 ft. 7½ in.	Wheel base	6 ft. 6 in.
Width over posts	8 ft. 7½ in.	Diameter of wheels	33 in.
From track to sills	41½ in.	Type of motors	G.E.-216—4-50 hp.

GOLD MEDAL FROM BUENOS AIRES CENTENARY EXPOSITION

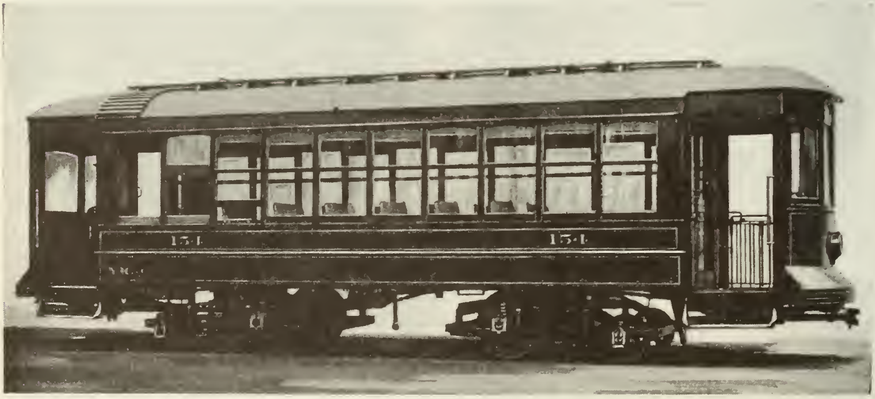
THE gold medal illustrated on this page was awarded The J. G. Brill Company at the Buenos Aires Centenary Exposition of last year. The exhibit consisted of two Brill semi-convertible cars, one mounted on the Brill single-truck No. 21-E and the other on high-speed trucks of the Brill No. 27-E1 type. The Wason Manufacturing Company also received the first award for steam car design and construction, the exhibit consisting of a train having a dining car, a first-class passenger car, a second-class passenger car and

a combination baggage and mail car. This award is exceedingly gratifying to The J. G. Brill Company, as a great deal of attention has always been given to the South American railway equipment and a large proportion of the city and steam cars in all parts of the country are of Brill manufacture. The long list of awards received by The J. G. Brill Company include the international expositions of Philadelphia, 1876; Chicago, 1883; New Orleans, 1885; Barcelona, 1888; London, 1897; Philadelphia, 1899; Paris, 1900; Buffalo, 1901; Charleston, 1902; St. Louis, 1903; Portland, 1905; Milan, 1906; Jamestown, 1907, and Marseilles, 1908.

SEMI-CONVERTIBLE CARS FOR YORK, PA.

BRILL No. 39-E TRUCKS

THE York Railways Company has placed in service a number of cars of the type illustrated, built by The J. G. Brill Company. These cars were purchased for the purpose of exactly filling the conditions of the service and without any experimental features. They were primarily for



Cars for York. The cars have the Brill Plain Arch Roof, semi-convertible window system and are mounted on Brill trucks of the No. 27-G1 type. The car was photographed on temporary trucks of another type city service and to take the place of smaller cars, in order to better take care of the travel on some of the lines and provide capacity for increase, thereby obviating additional mileage and additional units of equipment. Secondarily, they were for use in light suburban service, principally as trippers. The company has two classes of service (city and suburban) and, the new cars being interchangeable, therefore supply extra cars for both classes of service and decrease the number of extra cars required to be kept in reserve. The requirements were, therefore, of maximum seating capacity and minimum weight consistent with strength, and in addition ample width of aisle, with liberal space for loading and unloading. The city service consists of short runs of from 15 to 30 minutes, and the suburban lines, radiating from the center about 12 miles in each direction, with hourly headway.

CARS FOR YORK. As the system is laid out with track centers 11 ft. apart, the cars are permitted to be extra wide. The seats are 38 in. long and the aisle 26½ in. wide. Seating capacity, 40

A seating arrangement of six sections of cross seats in the center of the car, and a section of longitudinal seats in each end of the car with a capacity for five passengers on each, gives a total seating capacity of 40 passengers.

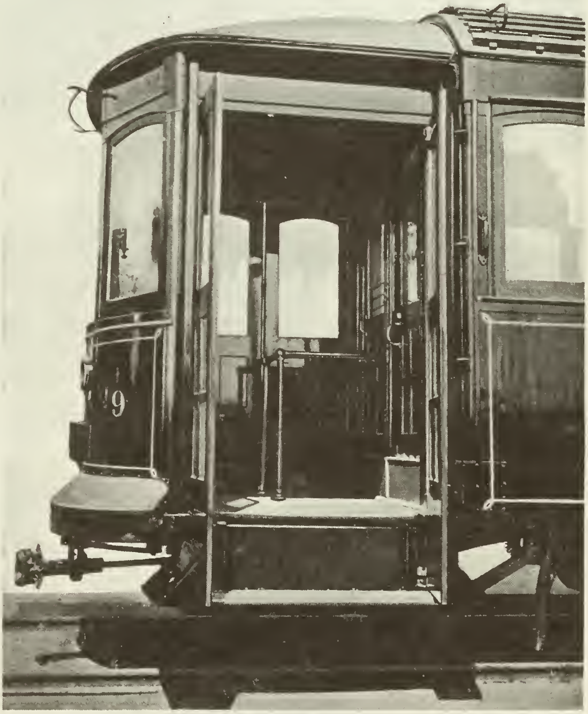
The cars are 9 ft. 1½ in. wide over all, and having the Brill semi-convertible feature, provides reversible seats 38 in. long with an aisle width of 26½ in. and an aisle width in the longitudinal sections of 5 ft. This ample width of car was obtained by the adoption several years ago (having equipment of this kind in view), of 11 ft. spacing between track centers, the track gage being 4 ft. 8½ in. The cars are built on a steel underframe and have a stiff but light superstructure, some gain in weight being secured by departing from the long-established convention of a monitor roof in favor of the plain arch roof, the appearance of which was favorably received; the ventilation, the company states, appears to be more practical than by means of opening deck sashes. To one trained from early days in railroading this is somewhat of a departure, but it is felt that while a monitor, when bright and new, may add to the appearance of a car, it does not when dark and dingy. The steel platform framing, Hedley anti-climbing bumpers and bumper cover-plates, contribute to safety. An incandescent headlight is attached to the dasher for city service and an arc headlight is used for suburban service. The cars are mounted on Brill No. 27-G1 trucks with G.E.-54 quadruple equipment, transferred from open cars.

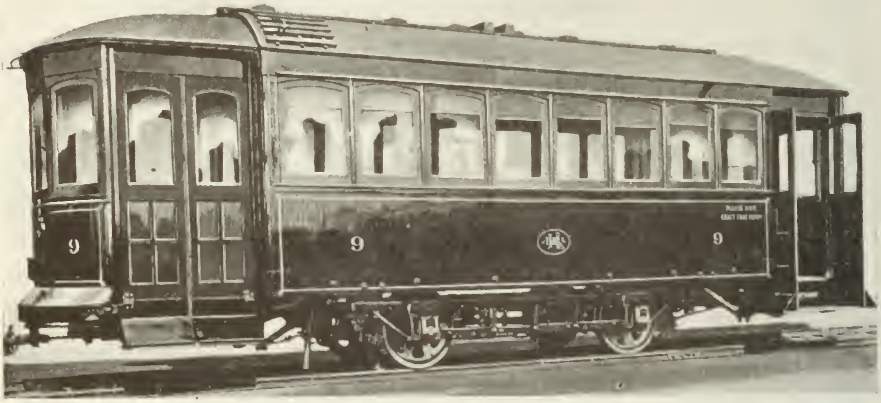
Length of body	26 ft. 0 in.	Seating capacity	40
Length over platforms	36 ft. 0 in.	Type of trucks	Brill 21-G1
Length of platforms	5 ft. 0 in.	Wheel base	4 ft. 0 in.
Centers of side posts	2 ft. 5 in.	Diameter of wheels	33 in.
Width over sills	8 ft. 6¾ in.	Size of journal	3⅞ in.
Width over posts	8 ft. 9½ in.	Motors	G.E.-54—4-40 hp.
Extreme width	9 ft. 1¾ in.	Wt. of body less elec. equip.	11,180 lb.
From track to sills	2 ft. 8⅜ in.	Wt. of electrical equipment	1,500 lb.
From sills over roof	8 ft. 10⅛ in.	Wt. of air brake equipment	1,500 lb.
From track to step	17¼ in.	Wt. of trucks	10.400 lb.
From step to platform	14½ in.	Wt. of motors	11,200 lb.
From platform to floor	8¼ in.	Total weight	43,480 lb.

ONE-MAN P-A-Y-E CARS FOR FREEPORT, ILL.

BRILL PLAIN ARCH ROOF

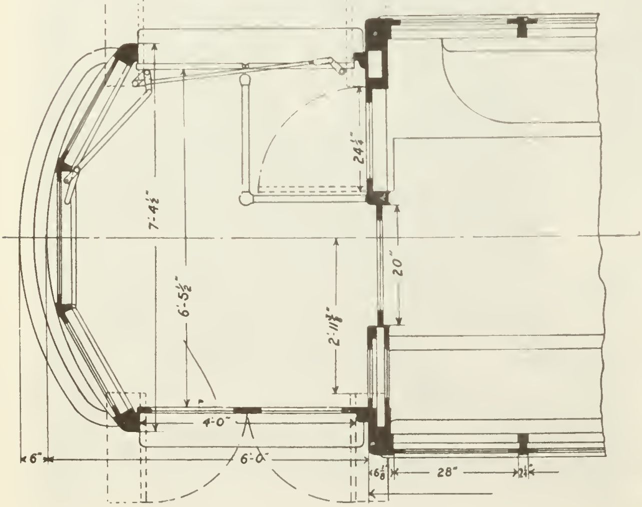
THE Freeport Railway & Light Company has placed in operation four new cars, built by the Danville Car Company, which have a number of interesting features. The motorman serves also as conductor, the rear doors being locked and the entrance and exit at the forward end. The step openings at both sides of the platforms are enclosed with two-part folding doors, one part hinged to the corner post of the car body and the other hinged to the corner post of the vestibule; both doors are operated together by a lever with handle within convenient reach of the motorman's position. A fare box is attached to the dividing rail. Inclined sheet metal guards secured to the lower part of the doors cover the steps and prevent persons gaining a foothold when the doors are closed. A sliding entrance


Cars for Freeport. The entrance and exit are at the far side of the platform



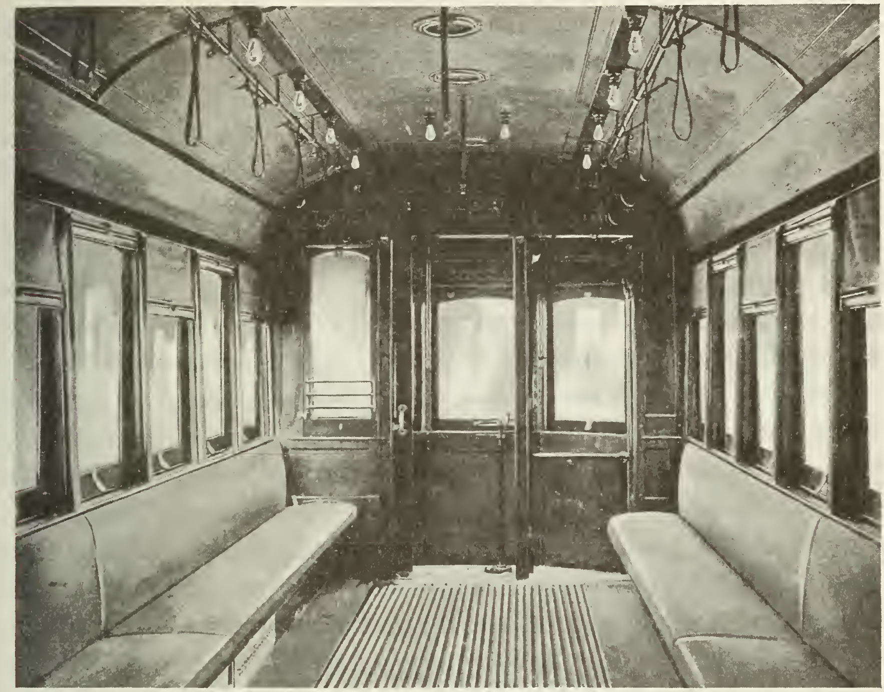
CARS FOR FREEPORT. The cars are for double end-operation and have steps at both sides of the platform

door and a hinged exit door are used in the bulkheads, the doors being so placed as to permit the longitudinal seat on one side to be brought against the end lining. The interiors are finished in cherry, with bird's-eye maple ceilings. The sashes in the side windows and vestibules are all arranged to drop into pockets. Six ventilators placed along the center of the roof furnish ample exhaust to keep the air in the car fresh when the doors and windows are closed.



CARS FOR FREEPORT. As the motorman serves also as conductor, the entrance and exit are both at the forward end

Freeport is a thriving city of 20,000 population situated in the northwest corner of Illinois. The railway, lighting and power properties are consolidated and are



CARS FOR FREEPORT. The exit door in the body end is hinged to the division post and swings against the dividing rail. Seating capacity, 28

connected with manufacturing interests. About 10 miles of lines are operated with 20 cars; the lines reach Highland Amusement Park, which is controlled by the railway company. The prepayment system of fare collection is being inaugurated with the new cars.

The principal dimensions and weights of the cars are as follows:

Length of body	21 ft. 0 in.
Length over platforms	33 ft. 0 in.
Length of platforms	6 ft. 0 in.
Centers of side posts	30¼ in.
Width over sills	8 ft. 4 in.
Width over posts	8 ft. 4 in.
Extreme width	8 ft. 7⅞ in.
From track to sills	30 in.
From sills over trolley boards	9 ft. 2⅜ in.
From floor to headlining	8 ft. 0⅞ in.

From track to step	14¾ in.
From step to platform	14 in.
From platform to floor	9 in.
Seating capacity	28
Weight of car body less elec. equipment	13,900 lb.
Wt. of electrical equipment	940 lb.
Weight of truck	6,200 lb.
Weight of motors	5,320 lb.
Total weight	26,360 lb.

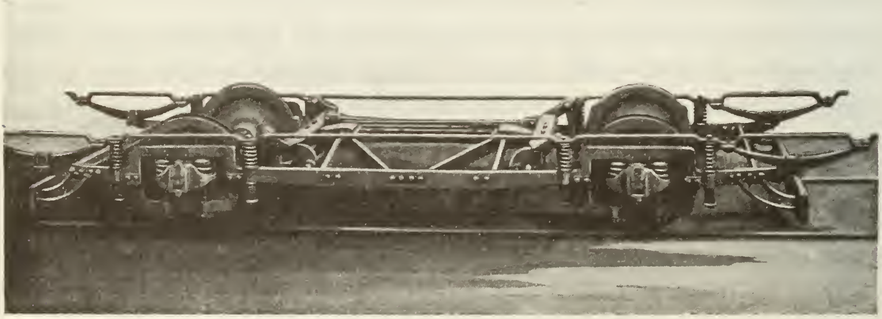
RADIAL-AXLE TRUCKS

THE radial-axle principle for railway trucks has been experimented with for half a century. For many years British and European engineers endeavored to adapt the principle to both steam locomotives and cars, with the object of securing greater ease and safety at curves, but after investigation discovered that their efforts were futile and based on incorrect theories, as it only applies to the short curves of street railways. At various times throughout the history of electric railroading the radial-axle principle has been taken up, but with no satisfactory results until recently, although many trucks have been built and operated. These trucks have been of two classes, one having each pair of wheels in an independent frame and the other having both axles within the same frame; the first has the advantage of lightness and the other of furnishing a better spring support to the car body. Six-wheel radial trucks have so limited a field that they will not be considered in this article. The large size of the early electric motors precluded success, but the advantages of having a longer wheel base for four-wheel cars have all along been so evident that all truck builders have given more or less attention to the subject, with the hope of some day working it out to a successful conclusion. Curves in city railway systems generally do not permit a wheel base of a non-radial-axle truck of more than 7 ft. 6 in., and therefore the long overhang of the cars, measuring 28 to 30 ft. over the platforms and in most cases having vestibules and carrying a large part of the load outside the wheel base, have made it impossible to entirely obviate oscillation. In Vienna, Nuremberg, Moscow, St. Petersburg and other European cities and in several British cities, the single-axle truck has been considerably used and in most instances discarded. During the period 1905-1907 quite a number of the British tramways introduced improved radial-axle trucks, both of the single- and double-axle type, but without success. Like their predecessors these trucks led the way to a better understanding of the subject, and the courageous managers of tramways who were willing to give them a thorough trial have paved the way for the successful type. If space permitted, it would be interesting to trace the steps in the development of the various types of radial-axle trucks down to the present. Some of the principles of construction were developed in attempts to correct the difficulties which were discovered after the trucks were put in operation, others were taken from non-radial-axle trucks and still others were devised to meet the contingencies which arose in the better understanding of the conditions necessary to fulfill.

The experiments of The J. G. Brill Company with radial-axle trucks, covering a long period, culminated in the type illustrated. In the latter part of 1910, a car mounted on the double-axle truck was put on the lines of the Philadelphia Rapid Transit Company, where it has been in daily service ever since and has proved successful in every particular. All experiments have been conducted entirely at the expense of the Brill Company and the truck shown has been adopted and introduced as the Brill "Radiax" Truck, and at present 61 are being built.

Like the other types of Brill trucks, the "Radiax" is built with solid forged side frames, and if there were no other distinguishing feature this principle of construction is fundamentally important and places the truck in a class by itself. Especially is the solid forged frame necessary for the long wheel-base truck of a radial-axle type, for if it has been necessary to construct the frame of the Brill rigid wheel-base truck No. 21-E on the solid forged principle, and this has been conclusively proved during a period of 20 years in which these trucks have been almost universally used, it is plainly evident that a longer frame with wider yokes makes an even greater demand for the strongest, lightest and most reliable construction possible. Built-up frames and those of the riveted plate type are unsuited to truck construction chiefly on account of their weakness in resisting side strains, and furthermore their multiplicity of parts has always been a serious objection. Castings, however well designed and made, should, of course, be avoided where it is possible to use solid forgings; therefore the facilities for making solid forged frames, only possessed by the Brill Company, gives to the "Radiax" Truck this fundamental factor of strength and simplicity in construction.

In explaining the principle on which the Brill truck radiates it should be first stated that the early designs of radial trucks, used chiefly in Europe, relied on sliding surfaces or rollways between the radiating and the non-radiating portions of the truck, which necessitated what was virtually a double frame. These trucks would radiate if well lubricated and kept in good condition, provided that the curves were negotiated at a fairly high speed to bring into play sufficient centrifugal force. The chief difficulty was that there was no force available to return the truck to its normal position when leaving a curve, and reliance had to be placed on springs to produce this effect. The springs required constant and careful adjustment, for if they were too powerful they would check radiation and if too weak the wheels would gag or leave the rails. It was found that swing links, by which the load was

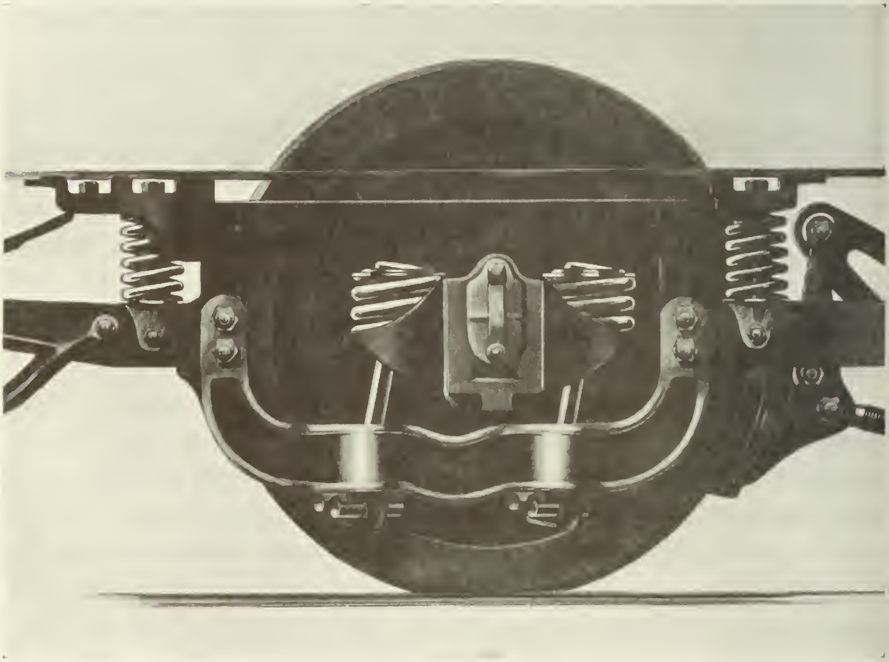


The Brill "Radiax" Truck (patented)

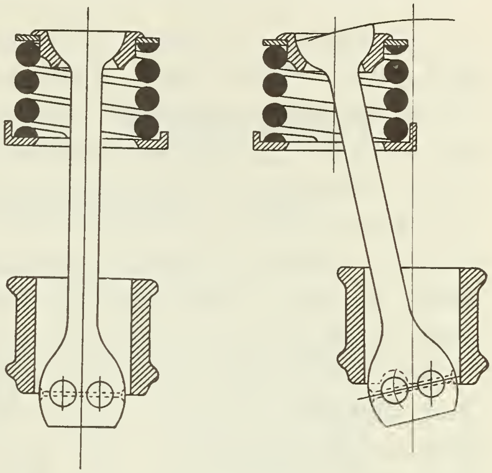
This car, mounted on a Brill "Radiax" Truck, has been in daily service on the lines of the Philadelphia Rapid Transit System since the latter part of 1910. Wheel base of truck, 11 ft.

suspended below the axle, reduced friction to a minimum and at the same time tended to keep the axles in parallel without the use of springs or other devices. But the swing link has a grave defect in that on straight track it transmits to the car body every irregularity of the track with multiplied effect, and this is particularly noticeable in cars having a wheel base shorter than 11 feet, as the king pins are necessarily close together, giving the whole construction a very small amount of lateral stability. Therefore the ordinary swing link radial-axle truck is generally found to oscillate horizontally, causing a snake-like motion. Until a means was found of obtaining free radiation, coupled with the return of the axles to their normal position on leaving a curve and at the same time holding the car body in a direct line on straight track, the radial-axle truck was doomed to failure.

How the swing link is made to perform its functions in a manner which gives both free radiation to the axles and stability and easy riding to the car body, is found in the patented device of The J. G. Brill Company, which consists of pairs of swing links of special form, mounted on spiral springs which rest in ears cast on each side of the journal boxes. The upper end of the links is of hemispherical form and rests in a socket casting at the top of the spring. The link passes through the spring and at its lower end has two pins, or trunnions, which engage in grooves formed in a casting enclosing the lower part of the frame yoke. On straight track with the link in upright position the frame rests on both pins. When a movement of the swing link commences, owing to a bad irregularity of the track being encountered, at that instant one or other of the pins comes out of engagement with its groove, even though the movement is imperceptible, thereby producing an inclination between the two supporting points of the link equal to half the distance between the pins, which sets up an immediate and powerful tendency to return to normal position. If the link was pivoted on a single pin at the lower end, the swing would require to be considerably more, or half



Journal box of "Radiax" Truck in extreme position



The swing link of the "Radiax" Truck in normal and extreme positions

the distance between the two pins of the Brill device, to produce an equal force to assist in returning the axle to its normal position. As the pin returns to its groove, any tendency of the link to swing past its normal position is instantly checked by the sudden force in the opposite direction generated as the other pin leaves its groove. It will therefore be seen that the double-pin arrangement has a two-fold office—one to assist in holding the link in an upright position against the effect of irregularities of the track, and the other to assist the link in its tendency to draw the axle back to its normal position when leaving a curve, or when the normal position of the axle is disturbed momentarily owing to track irregularities.

The double-pin device does not hinder the primary function of the links, of allowing the axles to radiate freely on curves. The links are much longer than in any other truck of this class and permit a considerable radial movement of the axles to take place without requiring the links to assume an excessive inclination, the resistance generated by their inclination being overcome by the centrifugal force stored in the car. If the car is stopped on a curve the axles will return gradually towards but never quite resume their normal position, but will rapidly increase their angle of radiation as the car is started again. It should be remembered that a radial truck can safely negotiate curves at a much higher speed than a rigid wheelbase truck and that the faster a curve is traversed the easier a truck will radiate and the less will be the flange wear.

An important feature of the Brill "Radiax" Truck is the elimination of the usual sub-frame which radiates with the wheels and axles, the motor being used to connect the wheels and axles to the king bolt or pivotal pin. There is no objection to pivoting to the motor, as the most exhaustive tests have proved that no undue wear on the bearings is caused thereby, and the ordinary construction of motor frames is amply strong to offset any risk of failure owing to the extra strain being placed thereon.

The brake gear has been a constant source of trouble on most designs of radial trucks. The Brill brakes are fitted with inside hung shoes, the advantages of which are well known, and the means of compensation in the body brake rigging for radial action, together with the other brake details, have been completely developed and experience has proved them to be entirely reliable under all conditions. "Half-Ball" brake hangers are used as in all Brill trucks and are self-adjusting for wear and therefore noiseless.

The radial-axle truck by providing a long wheel base to the car body reduces the overhang and therefore eliminates galloping motion, uncomfortable to passengers and destructive to the car and roadbed, reduces the side overhang on curves, and by furnishing a more extended support permits a lighter construction of the car body; it secures the full tractive force of the wheels, not obtainable in the two-motor equipment of an eight-wheel car. This truck is intended for cars longer than suitable for mounting on rigid wheel-base types and of lengths up to 26 ft. over the body corner posts.

BRILL MAGAZINE MAILING LIST

The annual checking of Brill Magazine mailing list is now in progress. Those who have not returned the addressed confirmation cards sent out last month are asked to notify us if they desire any change in their titles or addresses.

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Cable Address: "BRILL," Philadelphia

London Office: 110 Cannon Street, E. C.
Cable Address: "AXLES," London

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St. Louis, Mo.

G. C. Kuhlman
Car Company
Cleveland, Ohio

John Stephenson Company
Elizabeth, N. J.

Wason
Manufacturing Company
Springfield, Mass.

Danville
Car Company
Danville, Ill.

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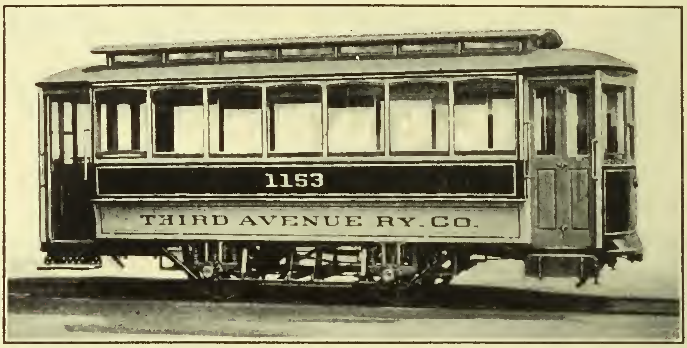

STORAGE BATTERY CARS

Eighty of these cars are in use on the cross-town lines of the Third Avenue Railway Company of New York—enough guarantee that it is the best type of its kind. For developing a suburban extension, a car of the above type with a one-man crew (rear door locked), is the most economical means obtainable, the battery being charged while the load on the power station is low. If current is available for charging the battery, it is an ideal car for equipping new lines and one which will always have its uses when traffic is developed sufficiently to install a regular trolley system. Also for supplementing regular cars in rush hour service, and for this the batteries can be charged while the load on the power station is low. Seating capacity, 26; total weight, 7 tons; radius of action, 100 miles and over on a single charge; current consumption at the motors, 475 to 500 watts per car mile. We furnish these cars complete and ready for operation.

THE J. G. BRILL COMPANY
PHILADELPHIA - - - PENNSYLVANIA

Vol. VI MARCH, 1912 No. 3

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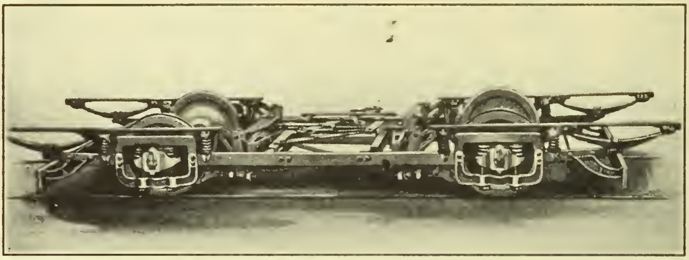
BRILL MAGAZINE

Cherry and Summit Streets
Toledo, Ohio

THIS ISSUE CONTAINS AN ARTICLE ON THE "STEPLESS" CAR



BRILL "RADIAX" TRUCK

(PATENTED)

The "Radiax" truck has been finally adopted by The J. G. Brill Company as its standard radial-axle type after the most exhaustive tests as to its complete suitability to all operating conditions. Years of study and experimentation have been given to the subject, but no truck has given complete satisfaction till this method of frame suspension was devised, which gives a free radial movement to the axles and, at the same time, prevents the carbody from oscillating horizontally on straight track. Heretofore radial-axle trucks have either worked too stiffly or allowed the carbody to swing easily from side to side, giving it a snake-like movement on straight track. The links, which suspend the frame of the "Radiax" truck from the journal boxes, have two pins at the lower end which normally engage in grooves, but when a movement of the links commences, instantly one of the pins comes out of engagement with its groove, throwing the weight upon the other pin and thus producing an immediate and powerful tendency to return to its normal position—the reason that the "Radiax" truck holds the carbody steady on straight track.

THE J. G. BRILL COMPANY
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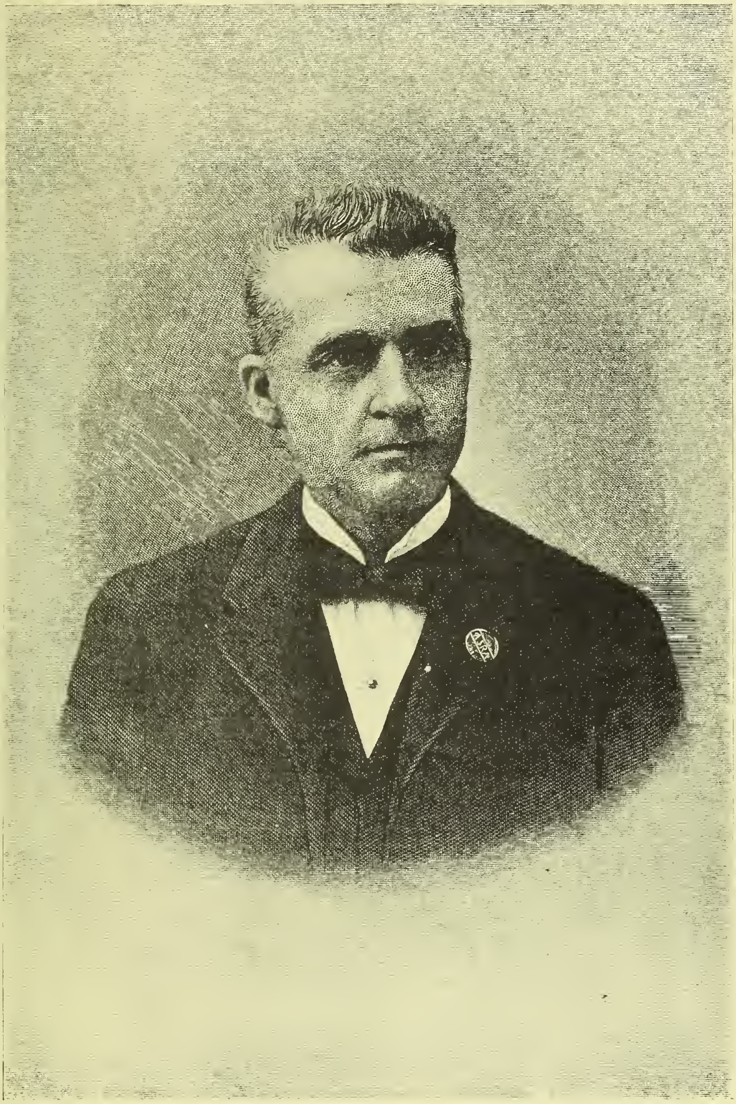

Albion E. Lang

President, Toledo Railways & Light Company

BRILL MAGAZINE

Vol. VI MARCH, 1912 No. 3

ALBION E. LANG

[WITH PORTRAIT INSERT]

ALBION E. LANG, President of the Toledo Railways & Light Company, was born September 12, 1849, at Huntington, Lorain County, Ohio. He attended school at Wellington, Ohio, until twelve years of age, at which time the death of his father made necessary the removal of the family to Oberlin, where he studied telegraphy. In 1863 he was employed as night telegraph operator for the C. S. & C. R. R. at Clyde, Ohio, and remained with this company as operator until 1868, when he was appointed assistant superintendent of the telegraph department of the road, stationed at Sandusky. In the spring of 1869, Mr. Lang came to Toledo as an employe of the Western Union Telegraph Company, chiefly taking night press reports, and devoting all spare time to study. In 1874 he resigned from the Western Union Company to enter upon active business and the study of law, and was admitted to the bar in 1878. He purchased an interest in the Monroe & Dorr Street Railway in 1881, became its president and was influential in effecting the consolidation of the several street railway lines of the city in January, 1885, and became vice-president and general manager of the Consolidated Company in September, 1888. This corporation had, with one exception, absorbed all the street railways existing previous to this time. In 1895 the Toledo Traction Company was formed, and it acquired during his presidency all the street railway lines, together with all the electric lighting business of the city. This company was absorbed by the Toledo Railways & Light Company in 1901, and he was made president, remaining till 1903, when he felt that its affairs had been brought into such order that he could safely leave his position of great trust and responsibility in the hands of others and retire from active service. In 1908 conditions were such that he was re-elected president, and remains in office to the present time.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

TOLEDO, OHIO*

TOLEDO, the principal city of northwestern Ohio, is situated on the banks of the Maumee River, about four miles from Maumee Bay, Lake Erie. It has an area of 28½ square miles and a population, according to the 1910 census, of 168,497. The city is one of the greatest railway and shipping centers in the country and is served by no less than 12 trunk lines, and in addition has a 30-mile belt line. Ten interurban electric railway systems, aggregating 585 miles, radiate from Toledo, making the city one of the foremost interurban centers. Two trunk canals transport large quantities of coal and ore. The river channel is 400 ft. wide and 21 ft. deep, admitting the largest lake vessels to the city; 25 miles of docks give the city an important place among the ports of the Great Lakes. Six passenger steamship lines communicate with Cleveland, Buffalo, Detroit and other points on the Lakes. The city park system includes four large, highly developed areas, in all about 700 acres. The Court House, Public Library, Soldiers' Memorial Building, Museum of Art and other public buildings, also the buildings of the Toledo University, the Toledo Medical College and Hospital, are large, handsome structures. Toledo is an important shipping point for the iron and copper ores and lumber from the Lakes Superior and Michigan regions, and for petroleum, coal, fruit and grain. Its foundry and machine shop products and its ship yards for the construction of large and small vessels have a leading place among its important industries.

The Toledo Railways & Light Company controls all the

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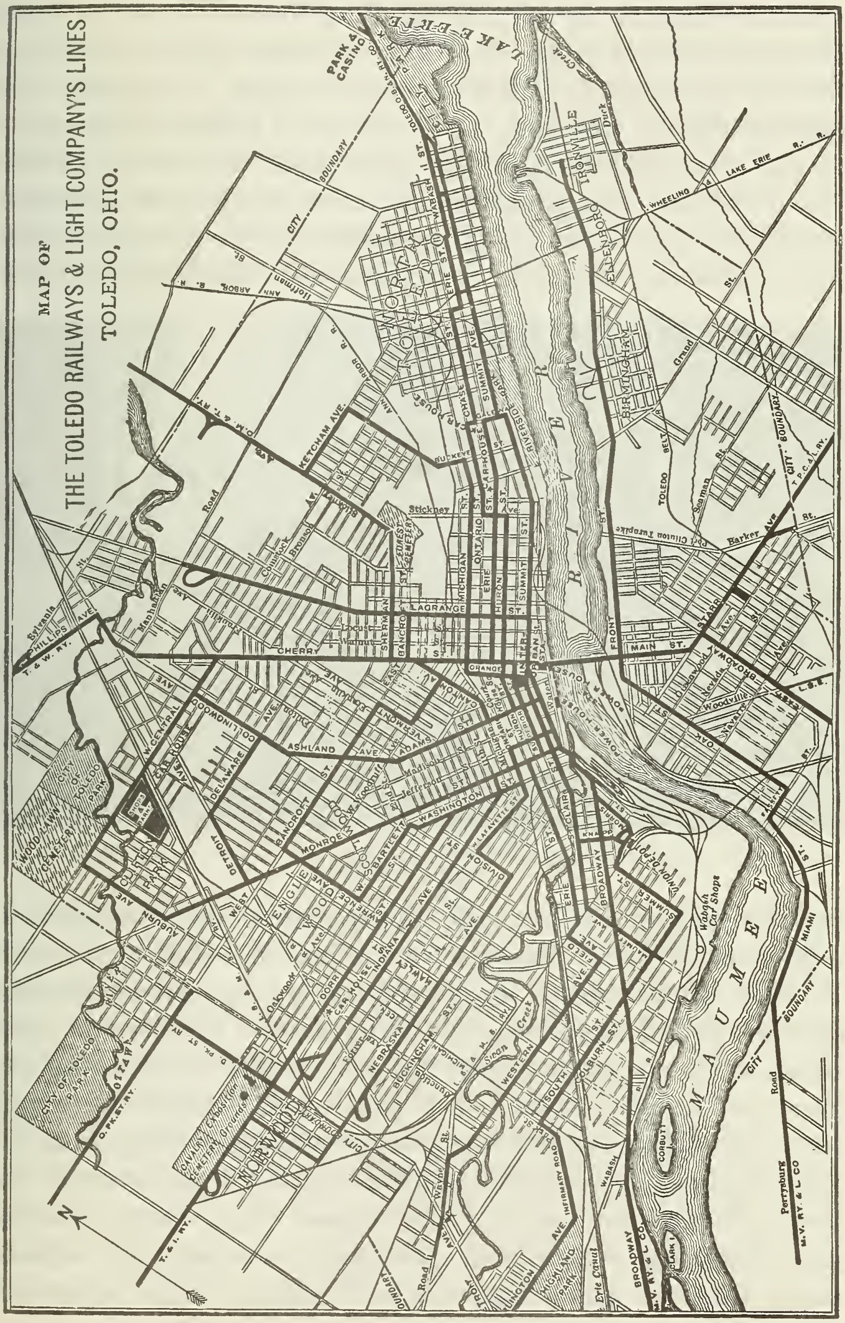
* The thirty-ninth article of the series.



MAP OF
THE TOLEDO RAILWAYS & LIGHT COMPANY'S LINES
TOLEDO, OHIO.

street railways in the city, amounting to 116½ miles of track. The lines radiate in all directions from the business section of the city and cross the river on one bridge at this point. The business section lies close to the river and almost at the center of the area included in the municipal boundaries. While it is inevitable that considerable traffic congestion is encountered, due to the converging within a few streets of about twenty-five city lines and ten interurban lines, the excellent routing system and the type of cars operated reduce this to a minimum, and ever since the consolidation of all of the lines, in 1903, Toledo has enjoyed better transportation facilities than are found in most cities of its class. Of the ten interurban systems which radiate in all directions from the city, four are owned by the Toledo Railways & Light Company, and the others operate over the company's lines from the interurban terminal station at the center of the business district. Besides the heavy traffic to and from the commercial and shopping center and the large number of factories which line the river front on both sides, a large revenue is

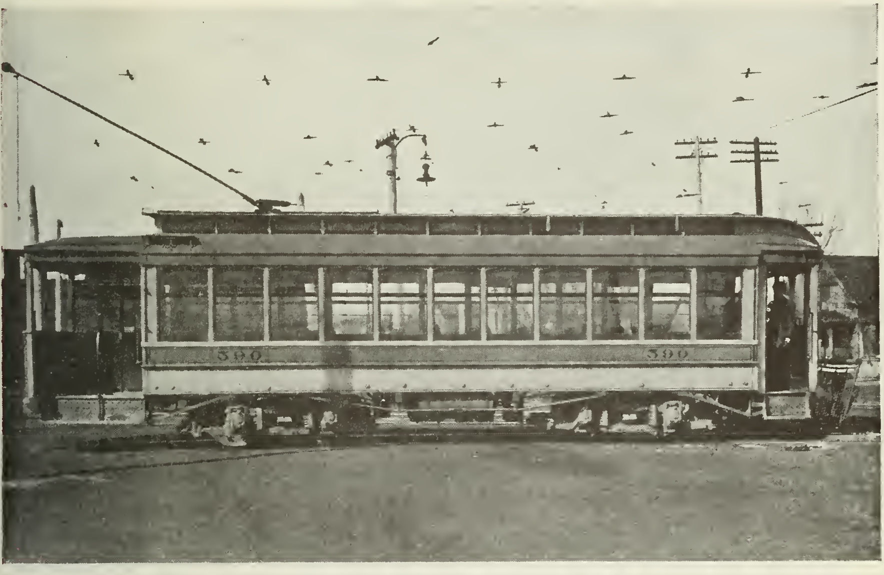
Toledo Railways & Light Company. Intersection of Superior and Adams Streets, at the heart of the business district derived from pleasure riding to the four city parks, the baseball field with its capacity of 15,000, and the railway parks and amusement resorts, especially that known as Toledo Beach, on Lake Erie, 17 miles from the city. To the latter place the lines traverse the beautiful Maumee River valley, consuming an hour in transit. The company has made the most of the natural advantages of the beach and lake front, the lagoons and groves at Toledo Beach, and has made the place so attractive with pavilions for music, dancing, bathing and boating, that through the summer season the cars are crowded on every fine day. The lines along the river bank above the city are also used by sightseers and visitors to old Fort Meigs, Fort Miami, and to the large filtration plant and other points of interest.

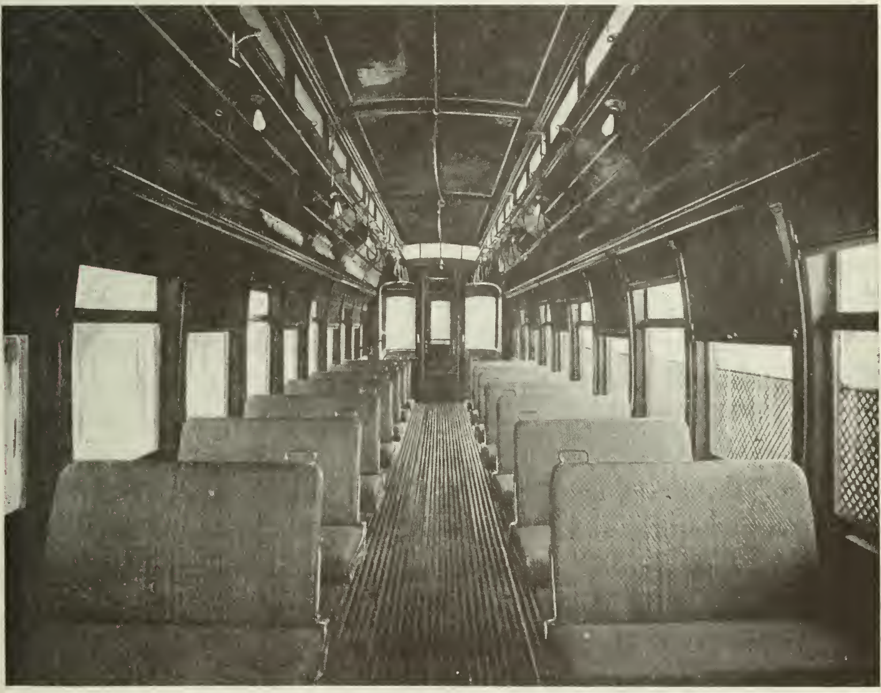
TOLEDO RAILWAYS & LIGHT COMPANY. Summit and Monroe Streets—one of the heaviest traffic points on the system

The standard car of the Toledo Railways & Light Company is shown on page 71, and has the Brill semi-convertible window system, pay-as-you-enter rear platform, and is arranged for single-end operation. This car is mounted on Brill trucks of the No. 27-F type, which is the standard truck of the system. A car with its trucks and complete equipment weighs about 37,000 lb.

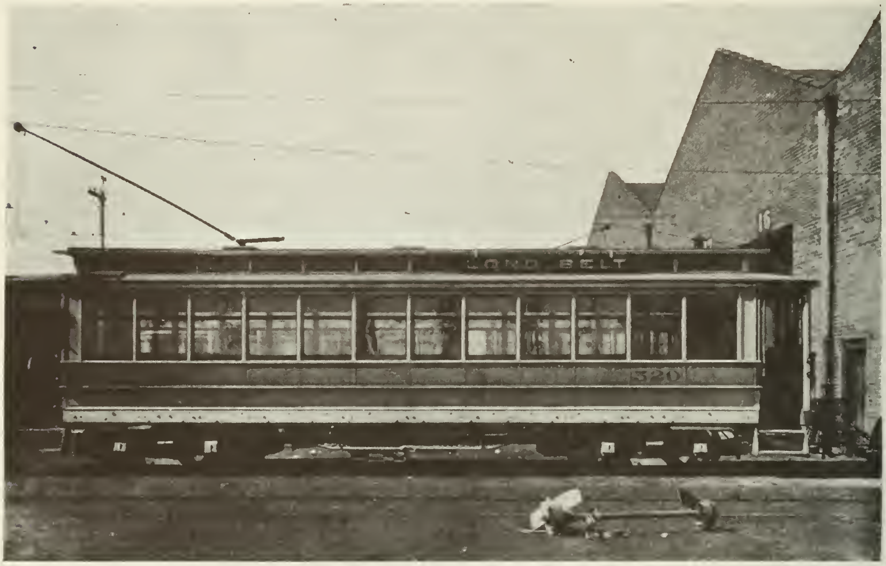
These cars measure 30 ft. 8 in. over the body, 41 ft. 8 in. over all, and are 8 ft. 3 in. wide over the posts. The seating arrangement consists of 14 transverse seats, 7 on each side of the car, two longitudinal seats at the rear occupying the space of 2½ windows each, and a longitudinal seat for two passengers at the forward left corner, a single seat at the opposite side and a single seat against the front bulkhead. This arrangement secures a seating capacity of 44 without conflicting with the arrangement of the doors and the operation of the pay-as-you-enter system. At the front exit the door and step are mechanically operated by the motorman. Wide wire screens protect the windows on the devil strip side. The bottom framing consists of 4 by 7¾-in. yellow pine side sills, with 15 by ⅜-in. steel plates on the inside, reinforced at the bottom by 6 by 3½-in. angles; end sills and center crossings are of white oak. The interiors

TOLEDO RAILWAYS & LIGHT COMPANY. Summit, St. Clair and Cherry Streets and Broadway converge here, and all have heavy traffic lines. At the river end of Cherry Street, a short distance from this point, is the bridge used by all lines serving the eastern section of the city





Toledo Railways & Light Company. The standard car of the system is a Brill Semi-Convertible, single-end, P-A-Y-E type mounted on Brill No. 27-F trucks



TOLEDO RAILWAYS & LIGHT COMPANY. Long car with double steps used on some of the longer lines

are finished in cherry, with the ceilings of ¼-in. composition board.

The company also operates double-end, single-truck closed cars with 20 ft. 8 in. bodies; double-end, single-truck open cars 24 ft. 8 in. over all; and single-end, double-truck open cars 37 ft. 7 in. over all. Express cars are of the double-truck type, measuring 35 ft. 4 in. over all.

The number of passenger cars in normal daily operation is 165, with a total number of 255 passenger cars available for maximum daily service. The "rush hour" periods of the day are from 6.30 to 8.00 in the morning and 4.30 to 6.15 in the evening. Transfers are issued on all cars for all points of the city. The number of revenue passengers carried in 1911 was 37,199,889 and the number of transfer passengers, 9,394,052; the car mileage for 1911 was 7,488,026. The length of single-track lines of the system is 28.39 miles, and double-track 81.53 miles, making a total trackage of 116.49 miles of standard gage track.

A NOVELTY IN CAR CONSTRUCTION

THE "STEPLESS" TYPE OF THE NEW YORK RAILWAYS COMPANY

THE "Stepless" car is the invention of Mr. Frank Hedley, Vice-President and General Manager, and Mr. J. S. Doyle, Superintendent of Car Equipment, of the New York Railways Company, which, on January 1st, 1912, assumed control of the management of the old Metropolitan Street Railway of New York City.

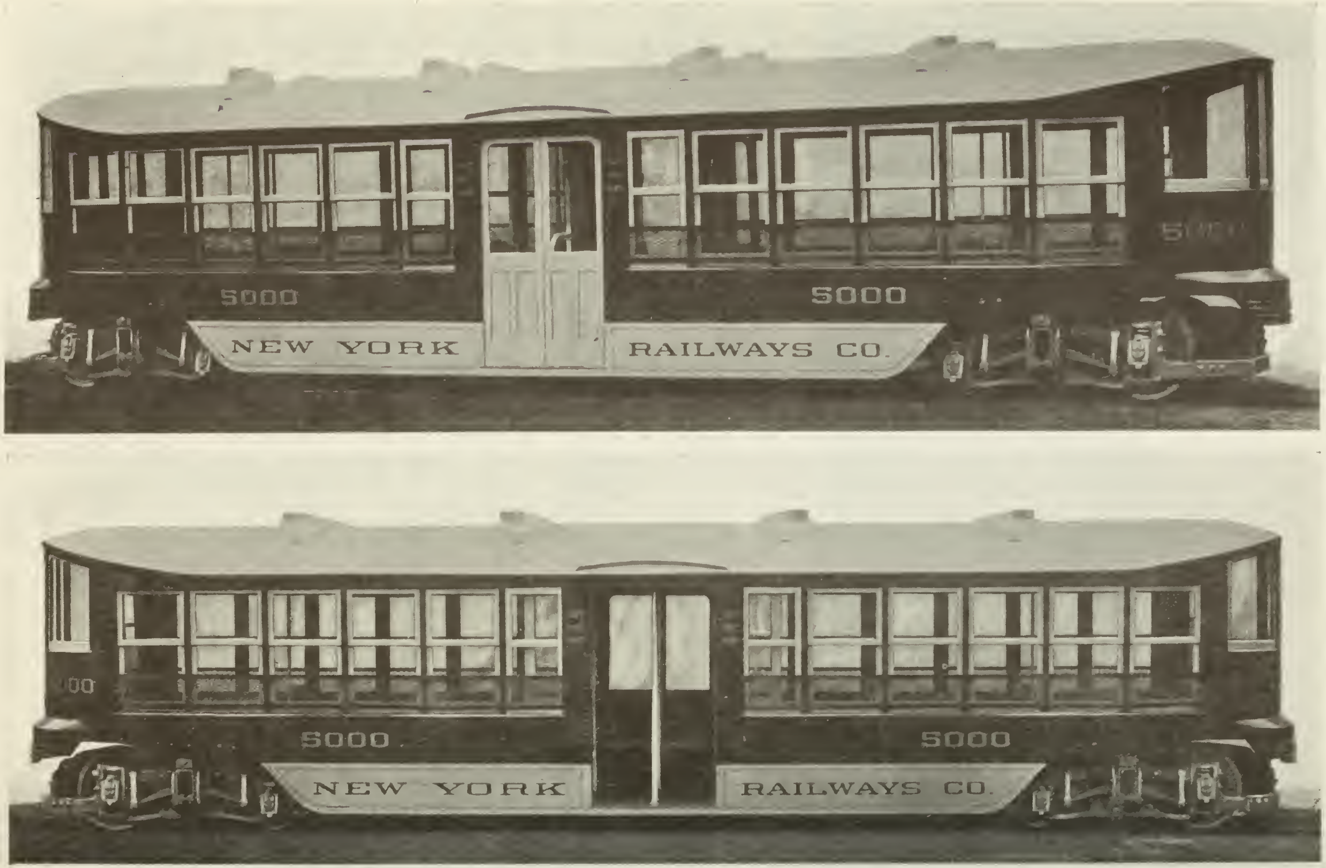
The following is an extract from a preliminary statement given to the New York papers:

"The New York Railways Company fully recognizes the hardship of the traveling public, especially to the aged and infirm and to women and children, caused by the high steps on all street cars. This is a general cause of complaint throughout the world. Passengers climbing in and out of the street cars are in almost constant danger, resulting in many personal injuries.

"This new 'Stepless' car is made possible by a novel and ingenious invention in car construction that places the floor of the car 10 inches above the street. The old style of cars are today 30 to 40 inches above the street. Passengers will not have to climb in and out of the cars by means of steps any longer, but will take one step from the street to the car floor, which is about the same as stepping from the street to the sidewalk.

"The 'Stepless' car is the greatest advance in the art of street-car construction in respect of the convenience of passengers.

"The elimination of steps on street cars will be appreciated when it is known that over one thousand million passengers climb in and out of street cars in New York



THE "STEPLESS" CAR. The center entrance is shown open and closed

City each year. The energy used in climbing is lost by the passengers.

"The following are some of the advantages possessed by this new style of car:

(1) A 'Stepless' car.

(2) Comfortable cross-seats and a large semi-circular seat at the end.

(3) Center side doors for entrance and exit.

(4) Dividing railing in the center of car.

(5) Wide aisle opposite cross-seats in car.

(6) Conductor standing in center of car collecting fares as passengers enter.

(7) All hand-rails and grab-rails made sanitary by being enameled white.

(8) Doors operated by conductor and controlled so as to make it impossible for passengers to alight from or board a moving car.

(9) Motormen provided with a complete vestibuled private compartment and a comfortable seat.

(10) Conductor provided with a comfortable place in the center of the car.

(11) Ventilation provided by ventilating jacks on the roof of car.

(12) Special provision made for heating the car, so that the fresh air is heated before it enters the car near the bottom.

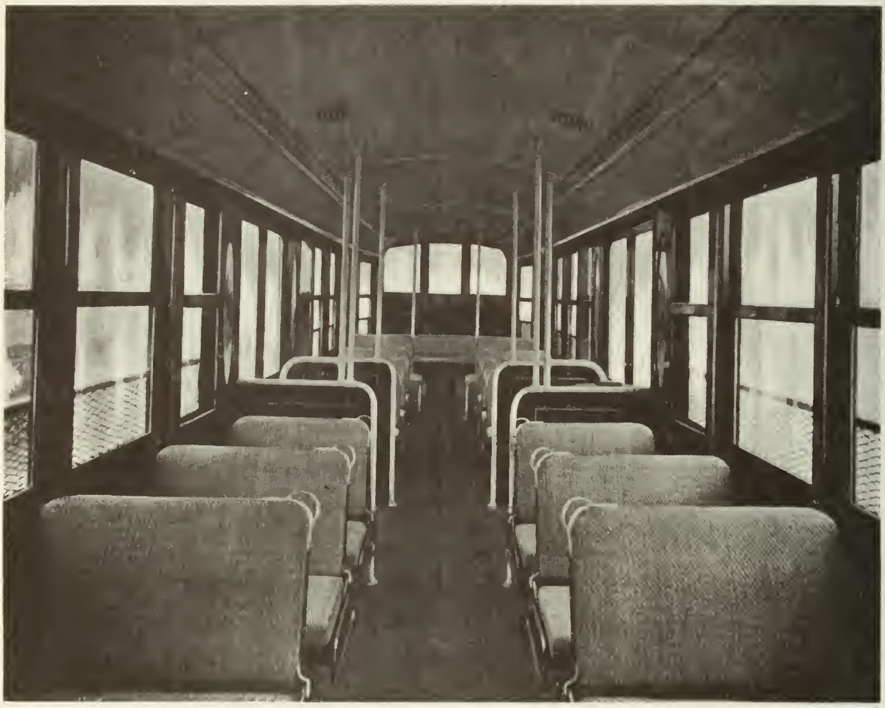
(13) Each end of the car constructed with a view of giving better protection to pedestrians, the ends being tapered off so that when the car comes in contact with anything the result is a glancing blow which will throw the object or person to one side or the other, clear of the car.

(14) Grab-rails all inside of car.

(15) Construction throughout makes it impossible for boys or any person to hang on or ride upon any part of outside of car.

(16) Passengers enter and leave the car at the center, so that the passenger travels the shortest possible distance from the street to and from the seats in the car.

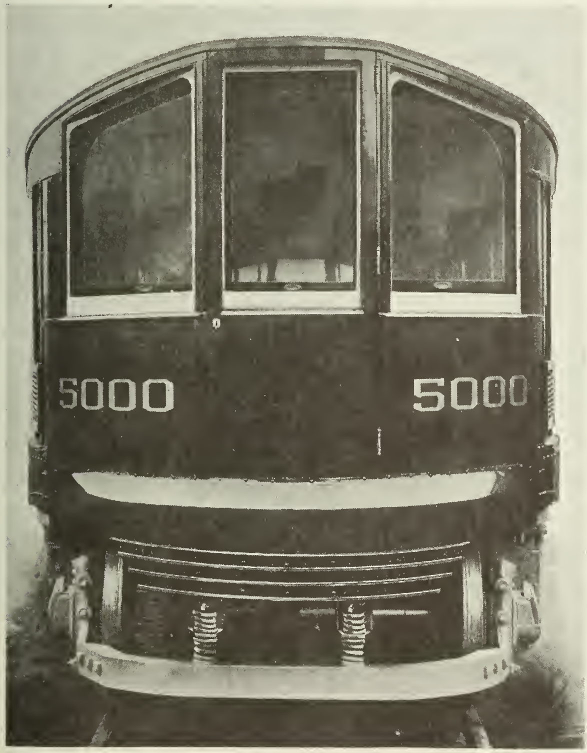
"The New York Railways Company believes that the public will appreciate this effort to introduce a new type of car designed to relieve the passengers of the necessity of climbing steps into and out of the car, which will add greatly to the public safety and also provide a sanitary car with the maximum convenience and comfort for the passengers and employees."



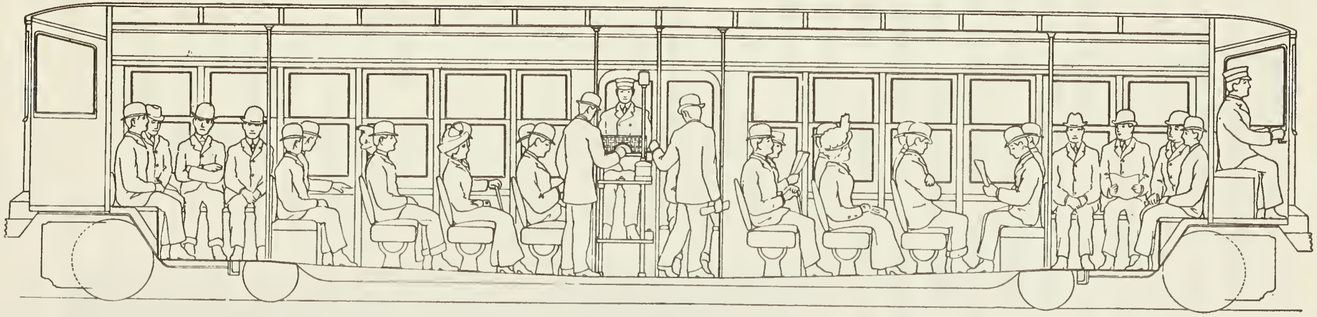
THE "STEPLESS" CAR. The windows are removable for summer service. Eight ventilators are of the improved natural draft type. All grab handles and railings are treated with white bath-tub enamel

It is not hard to find the source of inspiration of the "Stepless" car design. It is entirely logical that the engineers of the New York Railways Company have adapted the New York subway car to surface operation, but no one but an engineer familiar with the subject can realize the difficulties which surrounded such a proposition. Why this type was not devised before is due to the fact that light steel car construction is of recent development, and other structural details, more or less essential to the plan, are among the later improvements in the art of car building. A suitable truck for the purpose is also of comparatively recent design. There is nothing new in the center entrance idea for city cars; it has been used in a number of places in this country and abroad. Among the former where it may be found at present are Pittsburgh, Cleveland and Denver; in the last named city all of the motor and trailer cars have center vestibules. Neither is the drop-sill plan new. It is to be found in the cradle cars of steam railways, and, a number of years ago, motor cars for the London Subway System were built with drop-sills at one end to accommodate the large motor truck. Therefore the "Stepless" car has precedents for its main features, and yet it is not the result of a progressive evolution; in fact, it is a remarkable instance of radical departure from established methods.

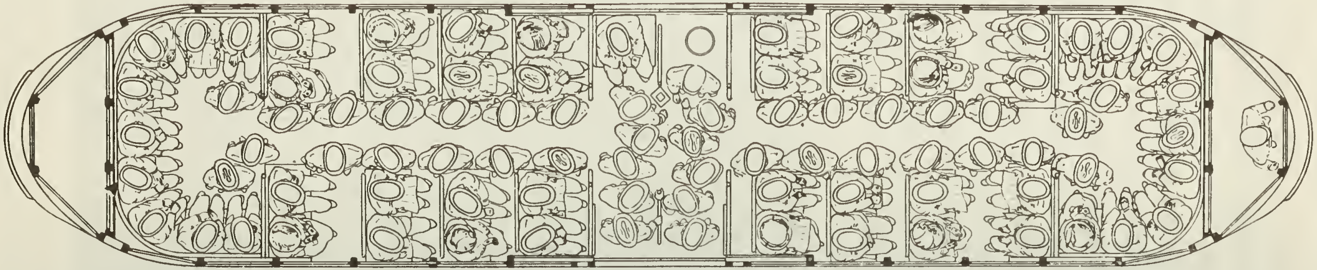
The primary objects of the "Stepless" car are the prevention of accidents and the reduction of time in loading and unloading. As everyone knows, who is at all acquainted with the subject, the most important part of a street car is its entrance and exit facilities; the seating plan, the window arrangement, the ventilation system and other parts of the design are insignificant in comparison with the methods of getting in and out. It is the step and door arrangement, and principally the step, which has chiefly to do with the safety of passengers and the time consumed during stops. It is probable that nothing can be materially added to the present knowledge of step and door design; every conceivable form of stationary, folding and sliding steps have been used with accompanying grab handles and safety step treads, but the fact remains that a step of any kind is dangerous for the use of hurrying passengers entering and leaving street cars. The elimination of steps at the ends of the car is impracticable, and it has remained for the "Stepless" car to accomplish the desired results, which are, in addition to the prevention of accidents, faster schedules, increased seating capacity and increased efficiency of the crew. As the floor of the car is but 10 in. above the pavement, no grab handles are needed and passengers mount and alight without effort or hesitation. The conductor, being at the center of the body, can observe and control the movement of passengers to the best advantage. With the doors at the center of the car, the average distance which passengers must traverse in getting to the exit is materially reduced, and this plays an important part in the saving of time. The conductor, being at the center and in the car body instead of being at the end and outside the bulkhead, makes it easy for him to be heard in all parts of the car when calling streets, which is also is a factor in reducing delays. While the entrance is divided at the center, it is not intended to keep one side for entrance and the other for exit, as at the principal collecting points in New York few passengers leave the car and vice-versa at the principal discharging points. At intermediate points, where but few are getting on and off, the conductor can with little effort divide the outgoing and incoming passengers so that the separate passageways can be used simultaneously. The easy and quick entrance and exit of passengers enables the reduction of width of the side opening, which increases the floor space for seating without being a detriment to loading and unloading. In comparison with a car of the same length over the vestibules and having 6 ft. platforms, the "Stepless" car increases the seating capacity by 9; in other words, in the "Stepless" car the center entrance section and the motorman's cabs occupy 9 ft. 1½ in. of linear measurement, while the platforms of the prepayment car of average type are 6 ft. long, or 12 linear feet occupied, making a difference in favor of the "Stepless" car of about 3 ft., or two additional passengers to each side, and, with two extra places gained at each end by the semi-circular seats, and the folding seat for one passenger at the center, accounts for the 9 additional seating places. The car illustrated accommodates 51 seated passengers. The efficiency of the conductor is increased by having him at the center, where he can to best advantage watch the passengers in the car and those entering and leaving. The closeness of the car floor to the pavement makes it unnecessary for him to assist aged or infirm passengers or children to mount and alight; therefore he can always remain in his position. The doors are opened and closed by a foot pedal which operates an air valve similar to the arrangement of the subway car doors, or can be manually operated by a lever. The floor of the motorman's cab is about 6 in. higher than the ordinary platform, giving the "Stepless" car an advanvantage in this respect, and the narrowing of the car ends, together with the large side windows of the cabs, provide an unusually wide outlook. The importance of completely separating the motorman from the passengers is a well-known factor to-



The "Stepless" Car. The tapered form of the ends of the car gives a wide outlook from the cab windows, increases the clearance on curves, and in case of colliding with a pedestrian or vehicle tends to strike a glancing blow

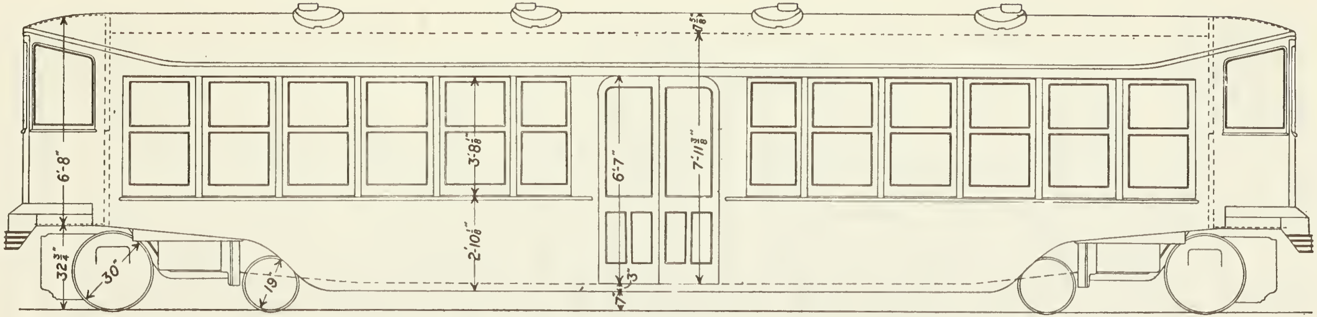


THE "STEPLESS" CAR. Elevation through center of car, showing location of end seats and floor in relation to the trucks; also position of conductor, change desk, fare box and register

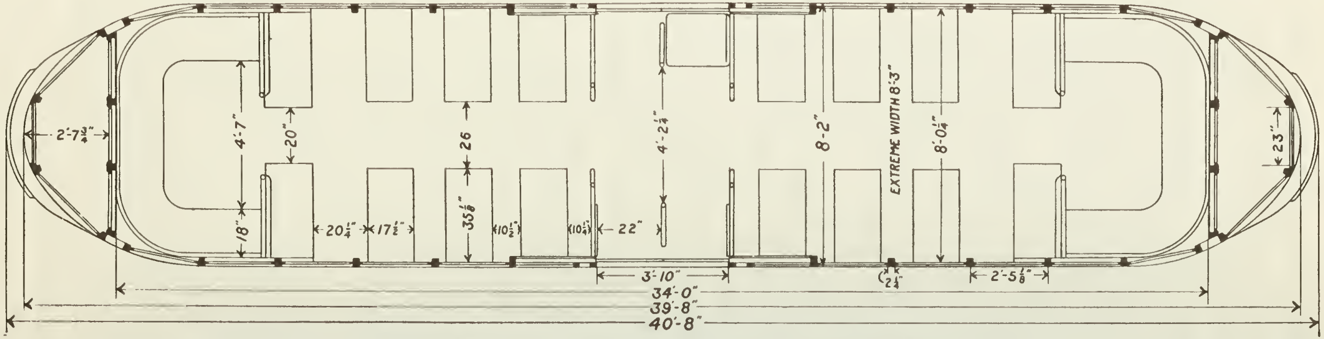


THE "STEPLESS" CAR. Bird's-eye view of car, showing 51 seated and 38 standing and entering passengers. The correct position of the conductor is shown in the other cut wards safe operation, and the moral effect upon the motorman of being elevated and in plain sight of the passengers is conducive to careful and attentive operation. An upholstered spring seat with back is provided for the motorman to lessen fatigue and thereby increase efficiency.

The chief difficulty involved in planning the "Stepless" car was to provide for the radiation of the trucks under the body and still secure a seating arrangement with all the seat cushions approximately on the same level. A modified form of the Brill standard single-motor truck was found to be best suited to the purpose and was redesigned to include a low-carried truck bolster. The pony wheels are 19 in. in diameter and the clearance for maximum radiation on curves is amply provided by housings under the end transverse seats, which are made a trifle longer than the other seats. The part of the floor surrounded by the semi-circular seat at each end of the car consists of a ¼ in. steel plate extending over the truck bolster; this plate is supported on the body bolster, which is deeply depressed at the center for the purpose. Thus by placing the floor at the car ends directly over the truck and between the side frames with the semi-circular seats over the side frames and side bearing rub plates, there is no sacrifice of seating space and, at the same time, the operation of the truck is unhampered. From a technical standpoint this part of the car design and the corresponding changes in the truck are the most interesting features of the whole plan. As it was necessary to raise the semi-circular seats 6 in. above the other seats to obtain proper clearance for the trucks, the floor at the end of the car is inclined to give the proper distance between it and the seat cushions. With the exception of the semi-circular seats and the folding single seats at the doors, the seats are all of the transverse type. The transverse seats next to the semi-circular have stationary backs, while the others have backs of the push-over type. The central section is arranged similar to the New York subway cars, with air-operated double sliding

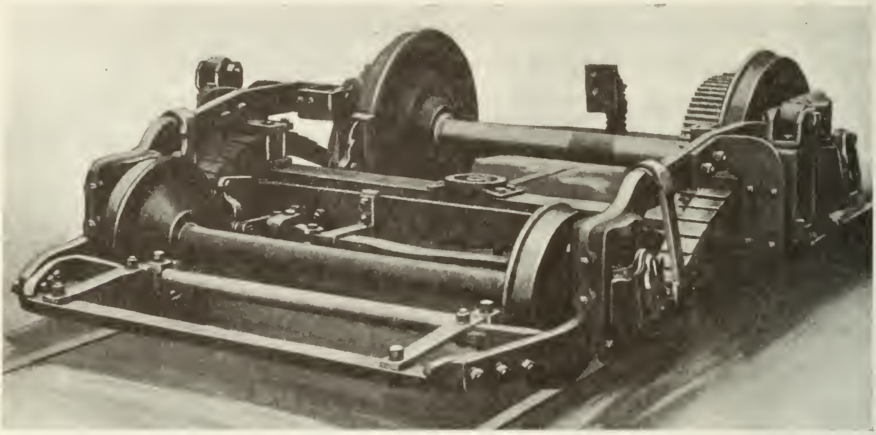


THE "STEPLESS" CAR. Side elevation showing general dimensions. Height from track over roof, 9 ft. 5 in., and over ventilators, 9 ft. 9 in.



THE "STEPLESS" CAR. Floor plan showing general dimensions. Seating capacity, 51 doors. The side windows have stationary upper sashes and the lower sashes are arranged to raise their full height; all of the side window sashes are removable, thereby adapting the car to summer as well as winter service. The bulkhead sashes and the sash in the cab doors drop into pockets. The tubular railings and uprights and the seat-back grab-handles are treated with white enamel, giving them a glazed finish like white porcelain. Eight natural draft ventilators, with an exhausting capacity in excess of the requirements of the Board of Health regulations, change the air in the car when the windows are closed. Heavy wire screen guards protect the window openings from chance contact with projecting parts of vehicles, and the steel sheathing of the sides is capable of warding off heavy blows from wagon hubs. The whole plan of the car, inside and out, disregards traditional methods and appearance, and is in every respect distinctly utilitarian and modern.

The cars are built of steel throughout, with the exception of the floor, window posts, headlining and roof boards. The bottom framing is composed of steel angles 4 in. by 3 in. by ½ in. reinforced for 7 ft. at the center of the car by two 2½-in. by 2½-in. by ⅜-in. angles in channel form. From the bolsters out the sills are formed of two 2¾-in. by 2¾-in. by ½-in. Z-bars, which are bent down at the ends and form a backing for the Hedley Anti-Climbers. The Anti-Climbers are 7 in. wide and made of 10.28-lb. section. The crossings consist of 3 in. channels of 4-lb. section, placed back to back; 2½-in. by 2½-in. by ⅜-in. angles are used for stringers and are in short sections, placed between the crossings and riveted thereto. The bolsters are built up of two 6-in. by 3½-in. by 11/16-in. angles riveted together and substantially secured to the side sills with heavy gusset plates. The entire side of the car is formed into a powerful girder by the use of ⅛-in. steel plates, which also form the side sheathing and letter panel. These plates, with their reinforcing bars and angles, are riveted to corner posts, each consisting of two 3-in. by 3-in. by



THE "STEPLESS" CAR. Brill single-motor truck with low-carried bolster. The support for the conduit plow is shown just outside of pony wheels

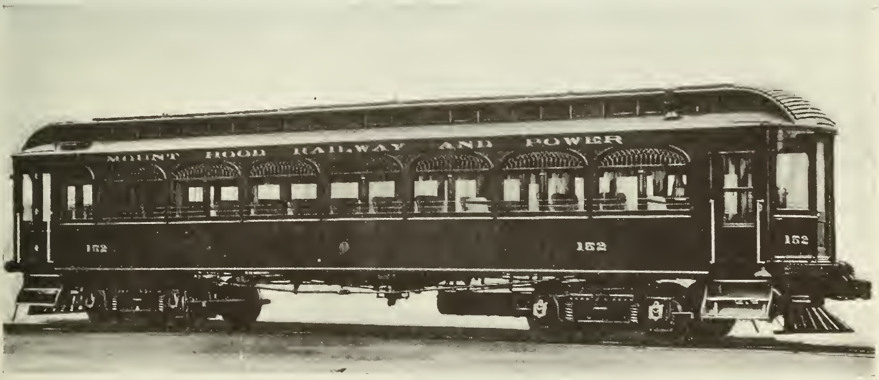
½-in. angles. The door is framed with two ⅛-in. steel plates having a continuous bar 1½ in. by 1 in. between the plates, also by another bar 1½ in. by 1 in. secured to the sill angle and to the top plate reinforcing angle. Another angle is bolted through the top of the posts to the carlines. The side sheathing is riveted to the angle sill and is reinforced at the top by a 3-in. by ⅜-in. bar riveted to the door plates and to the angle corner posts. The bulkheads are located at the angle corner posts, and the lower part is composed of a plate 11 in. by 3/16 in. riveted to the corner post and reinforced at the top by a 1½-in. by 5/16-in. bar, and at the bottom by a 3½-in. by 3-in. by ⅜-in. angle. Weight of car body, less electrical equipment, 13,740 lb.

An interesting fact in connection with the building of this first car of the "Stepless" type is that the general plans were received at the works of The J. G. Brill Company, Thursday evening, February 29th, and on the following Friday, March 8th, the car and trucks were photographed and shipped. The design and construction were discussed a few days previous to receiving the plans, but most of the structural details of the car and the modification of the trucks were made after the general plans were received.

CARS FOR MT. HOOD RAILWAY & POWER COMPANY

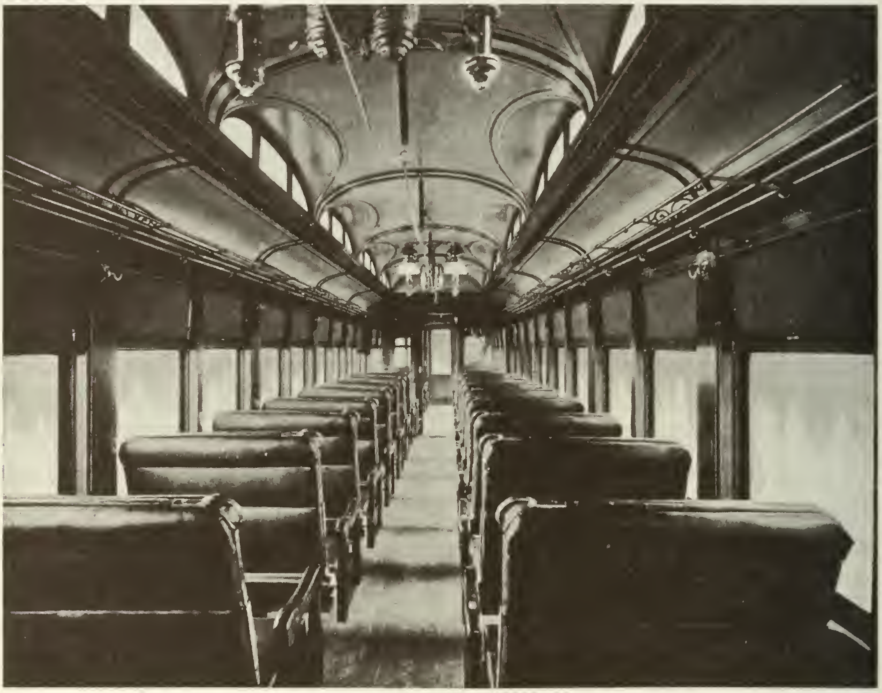
PASSENGER AND BAGGAGE TYPES

THE G. C. Kuhlman Car Company recently delivered four passenger and two baggage cars of the types illustrated to the Mt. Hood Railway & Power Company of Portland, Oregon. The cars comprise the initial equipment of this line, which has been operated as a steam road and extends out of Portland in an easterly direction for a distance of about 30 miles. The present terminus at Portland is Montavilla, a suburb of the city, where passengers and freight are transferred to the lines of the O. W. R. & N. and O. W. P. Railways until the franchise is obtained which will give entrance into the center of the city. The first eight miles of the line traverses a suburban country, laid out in rapidly developing town sites, then for nine miles the line extends through a highly developed agricultural and dairy district, after which it follows the Sandy River Canyon, where there is a maximum grade of three per cent and a maximum of 30° compensated curve. The line ends at Bull Run, where the



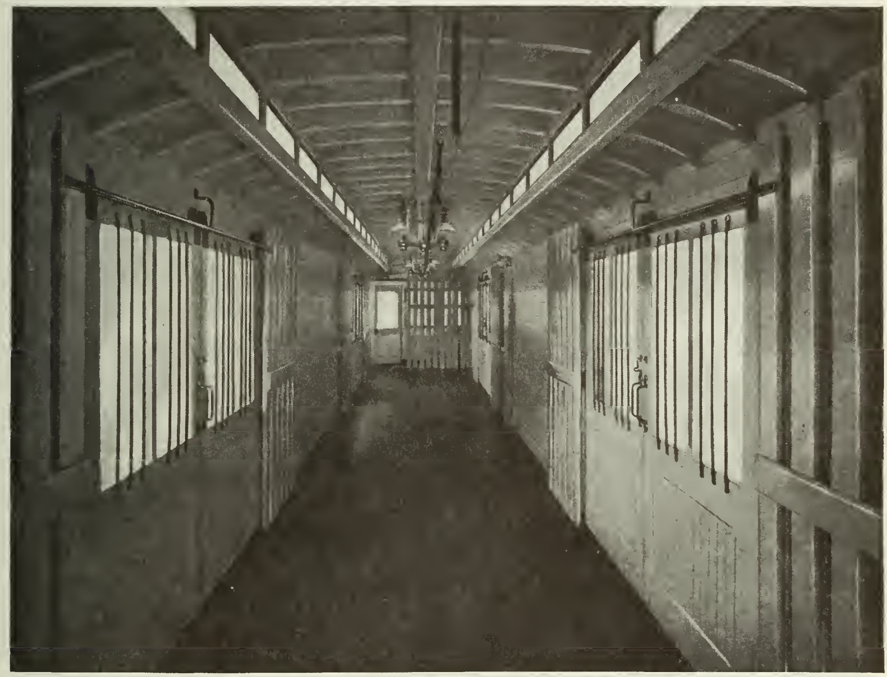
CARS FOR MT. HOOD RAILWAY & POWER COMPANY. These fine examples of interurban car construction comprise the initial equipment of this line. The trucks are the Brill No. 27-M.C.B.3 type power station is located, but surveys have been made for a 60-mile extension through a district much in need of transportation facilities.

The passenger cars are divided into general and smoking compartments, the former seating 44 and the latter 14. The seats are of the Brill "Winner" type, with 24-in. three-part backs and upholstered in leather. A hot water heater is located in the corner of the smoking compartment and a toilet room at the diagonal corner of the car. Mahogany is used for the interior finish, with empire ceilings of waterproof board. The side windows are arranged to raise in the usual manner and the central section of the deck sashes is hinged at the bottom, enabling them to be opened for ventilation. Hinged doors are provided at the center of the vestibules for



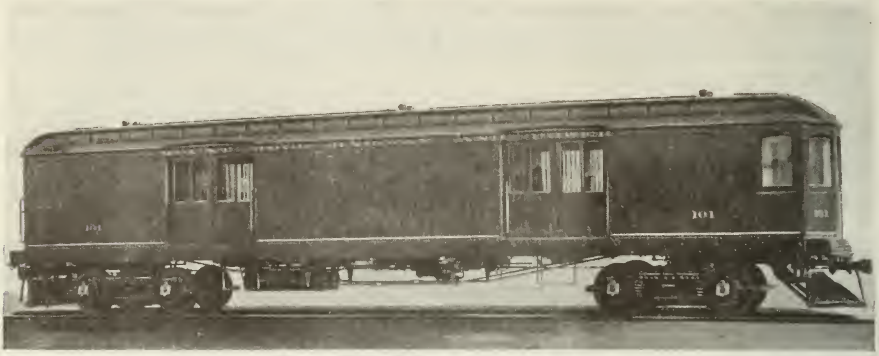
CARS FOR MT. HOOD RAILWAY & POWER COMPANY. The general compartment seats 44 passengers and the smoking compartment 14. The seats are of the Brill "Winner" type communication between cars. Hedley Anti-Climbers are attached to the bumpers and the cars are equipped with M. C. B. couplers.

The baggage cars have a capacity of 40,000 lb. and are substantially constructed, with bottom framing consisting of yellow pine side sills, 5 ⅞ by 8 ⅞ in. reinforced on the outside by 8 by ⅝-in. steel plates. The cross sills and intermediate members are of 4 ½ by 5 ½ white oak; the end sills, also of white oak, are reinforced on the underside by heavy steel angles; two intermediate sills and two center sills are of steel I-beams with yellow pine fillers, extending from bumper to bumper. The side doors have 6 by 6-ft. openings, and hinged doors are placed at the diagonal corners with floor rollers to facilitate the handling of long material.



CARS FOR MT. HOOD RAILWAY & POWER COMPANY. The side doors have 6-ft. openings. Doors are provided at diagonal corners and have floor rollers to facilitate the handling of long materials

Dimensions and weights of the passenger cars follow:



CARS FOR MT. HOOD RAILWAY & POWER COMPANY. These cars are among the largest ever built for baggage and express service. The trucks are capable of a speed of 75 miles per hour

Length over corner posts	42 ft.	9⅝ in.
Length over platforms	52 ft.	1⅝ in.
Length of platforms	4 ft.	8 in.
Length of smoking comp.	11 ft.	4 in.
Centers of side posts	2 ft.	$9\frac{7}{16}$ in.
Width over sills and posts	8 ft.	3 in.
Extreme width	8 ft.	6 in.
Height from track to side sills	3 ft.	5¾ in.
Height from sills over trolley boards	9 ft.	11 in.

Height from floor to center of headlining	8 ft. 9 in.
Track to step	$16\frac{7}{16}$ in.
Risers	11¼ in.
Seating capacity	58
Weight of car body less elec. equipment	38,420 lb.
Wt. of electrical equipment	1,400 lb.
Weight of trucks	23,520 lb.
Total weight	63,340 lb.

Dimensions and weights of the baggage cars follow:

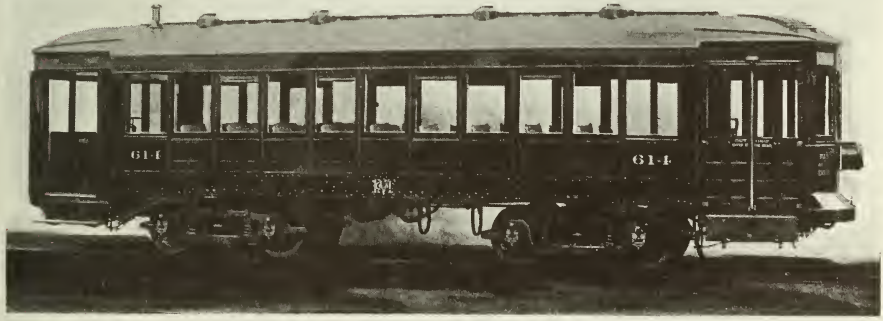
Length over vestibules	56 ft. 0 in.
Lgth. of motorman's compartment, each end	4 ft. 0 in.
Length of baggage comp.	48 ft. 0 in.
Width over sills and posts	8 ft. 0 in.
Extreme width	8 ft. 3½ in.
Height from track to side sills	3 ft. 6⅜ in.
Height from side sills over trolley boards	9 ft. 5¼ in.
Type of trucks	Brill No. 27-M.C.B.3
Wheel base	6 ft. 6 in.
Diameter of wheels	37 in.
Size of journals	5 in. by 9 in. M.C.B.
Weight of car body and trucks with electrical equipment	62,100 lb

CARS FOR MT. HOOD RAILWAY & POWER COMPANY. A view on the line in the picturesque Sandy River Canyon

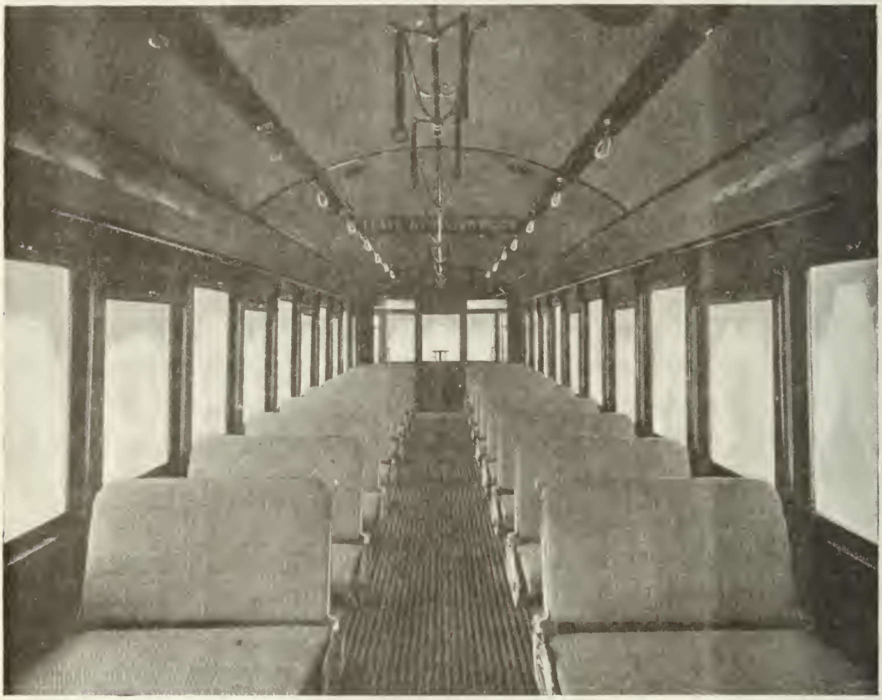
CONVERTIBLE PAY-WITHIN CARS FOR ALLENTOWN, PA.

BRILL PLAIN ARCH ROOF

THE Lehigh Valley Transit Company has received from The J. G. Brill Company ten cars of the type illustrated and has put them in service on its lines at Allentown. The cars are similar to a lot of ten cars described in BRILL MAGAZINE, issue of September, 1910, except that the cars of the former order had monitor decks and pay-as-you-enter platforms. The sashes and panels are made in one piece, which is locked in place when the cars are equipped for winter service and replaced by wire screens during the warm weather. There are nine of these panels on each side of the car and fixed steel panels at the end windows. The window panels are made of mahogany below the window sill and are arranged to be interchangeable. The screens are made of 1¾ in. diamond mesh and extend from the top of the sill to a height of 44 in. above the floor; they are held in place by the same strips which hold the window panels. The doors are of the four-part type and are operated by air in conjunction with the steps from a



CARS FOR ALLENTOWN. These cars are built with steel underframes and are similar to a lot furnished in 1910. Brill No. 27-M.C.B.1 trucks furnish fast service outside the city limits standard located on an extension to the body floor outside the end sill. The plain arch roof has detachable hoods and is equipped with natural draft ventilators; Agosote is used for the headlining. Nine transverse seats on each side of the car are of the Brill "Winner" type and have 36-in. by 17½-in. cushions and 18-in. backs.



Cars for Allentown. The panels and sashes are made in one piece sections for removing in summer and replacing with wire screens. Seating capacity, 44

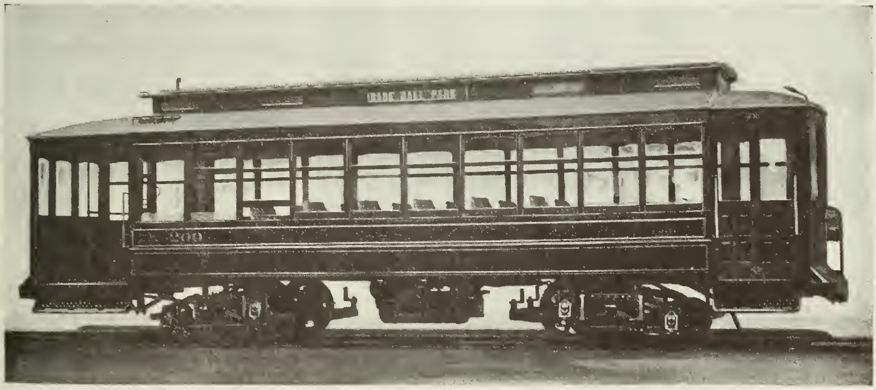
The bottom framing is of all-steel construction, with 14-in. by ¼-in. steel plates, reinforced at top with 3½-in. by ⅝-in. plate and at the bottom with 6-in. by 3½-in. by ⅜-in. angle; the center stringers are 4-in. channels and the crossings are made in the form of open trusses with 4-in. channel upper members; there are also two 5-in. channel crossings and the end sills are composed of 10-in. channels; diagonal braces are composed of 3-in. by ⅜-in. steel plates; thickness of corner posts, 3⅝ in.; thickness of side posts, 2¾ in.

Length over corner posts	30 ft. 1 in.	Seating capacity	44
Length over bumpers	43 ft. 5 in.	Type of trucks	Brill No. 27-M.C.B.1
Length over platforms	42 ft. 1 in.	Wheel base	6 ft. 0 in.
Length of platforms	6 ft. 0 in.	Diameter of wheels	34 in.
Width over sills and posts	8 ft. 8 in.	Size of journals	4¾ in. by 8 in.
Height over trolley boards	12 ft. 1 in.	Type of motors	West. 101—4-40 hp.
Height from rail to top of floor	3 ft. 6 in.	Weight of car body, less electrical equipment	17,500 lb.
Bolster centers	18 ft. 6 in.	Weight of trucks	8,100 lb.

BRILL SEMI-CONVERTIBLE CARS FOR AUGUSTA, GA.

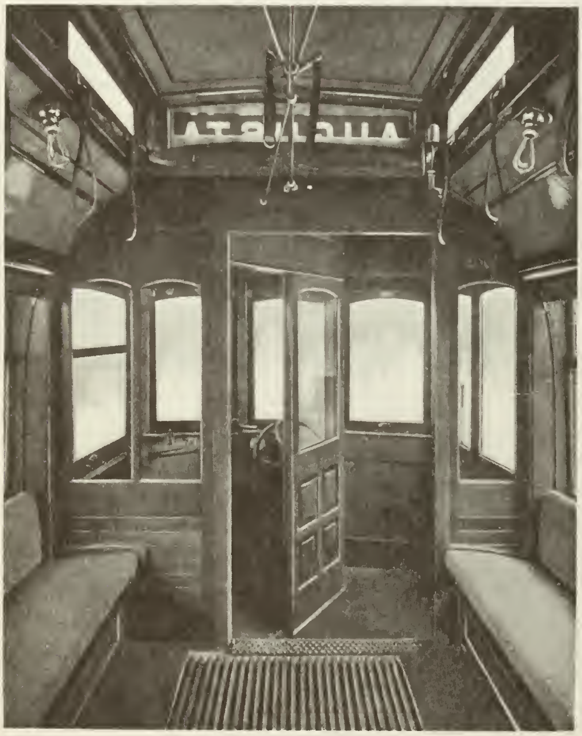
STEEL UNDERFRAMES

THE Augusta-Aiken Railway & Electric Company has lately put in operation on its lines in Augusta six Brill semi-convertible single-truck, pay-as-you-enter cars. The company operates all the lines in and about Augusta and its neighboring city of Aiken, and the Brill Company has furnished the cars for the high-speed service between the two cities. In all, over a hundred cars are in operation on the

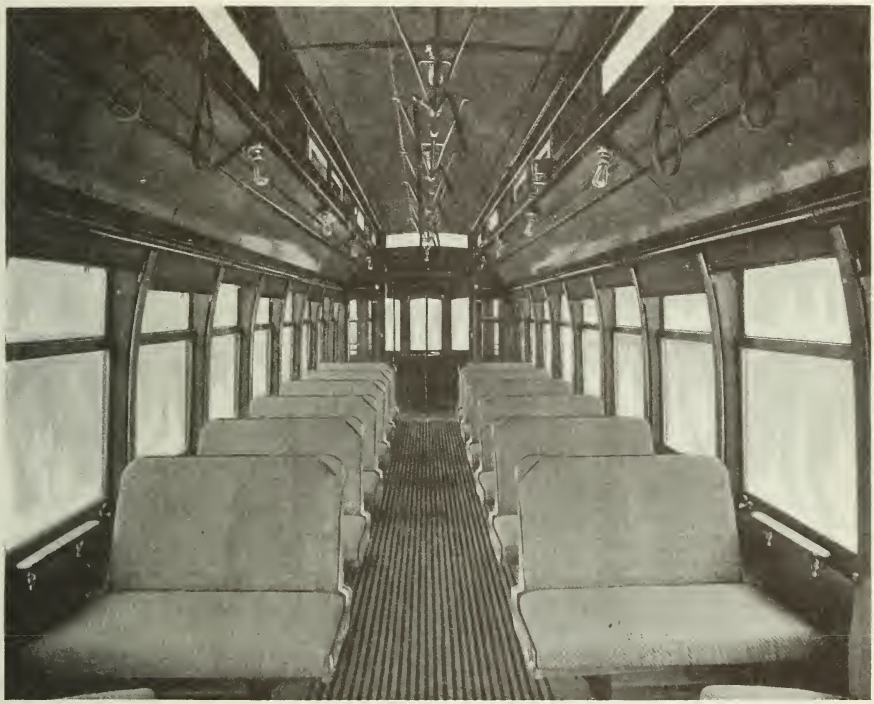


CARS FOR AUGUSTA. Pay-as-you-enter cars adopted as the standard type for the Augusta lines. The cars are mounted on Brill No. 39-E trucks system. The new cars have been adopted as the standard city type and are admirably suited to the traffic and climatic conditions of Augusta. During a large part of the year the windows are all raised into roof pockets and are always available for protection against inclement weather. The cars being operated from one end, the seats have stationary backs; they are of Brill manufacture. The photograph of the interior shows the wide aisle obtainable in the Brill semi-convertible car, as the seat ends are brought between the window posts, and the difference between the outside and the inside width is but 4 in. At each end of the car the longitudinal corner seats accommodate four passengers each, leaving ample standing room near the doors. The window sills, being but 24⅝ in. above the floor, are equipped with arm rests, which is the standard practice of the builders.

The interiors are finished in cherry, with doors and windows of the same. The exit door at the front platform is hinged against the vestibule corner post and is operated by a handle located in the cab. The vestibule windows at front and rear are all arranged to drop into pockets. The cab



CARS FOR AUGUSTA. The front exit door and step are operated from the motorman's cab



CARS FOR AUGUSTA. As the cars are operated at the forward end the entrances and exits are at one side only and the seats have stationary backs

windows and the central window of the rear vestibule are equipped with sash adjusters, which hold them at various heights. The steel underframes are built of 18 by 3/16 in. steel sill plates, reinforced at the top with a 3 by ½-in. plate, and at the bottom with a 2½ by 2½ by ⅜-in. angle; 10-in. channels are used for the end sills, and the diagonal braces are of 3 by ⅜-in. steel plates. The center stringers are made of 4-in. channels, and two of the crossings are of 5-in. channel section and two of 4-in. The crossings are substantially secured to the side sills with gusset plates, and these crossings are made in the form of an open truss with the top cord of a 4-in. channel and the bottom of a 4 by ⅜-in. steel plate, dropped at the center and brought underneath the center stringers.

The principal dimensions are as follows:

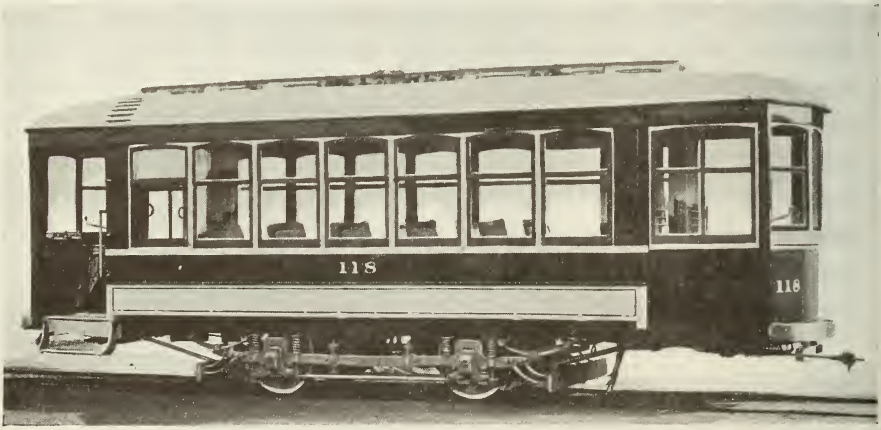
Length over corner posts	26 ft. 10 in.
Length over platforms	37 ft. 1 in.
Length of front platform	4 ft. 3 in.
Length of rear platform	6 ft. 0 in.
Centers of side posts	2 ft. 7½ in.
Width over sills	7 ft. 11¼ in.
Width over posts	8 ft. 2 in.
Extreme width	8 ft. 5⅜ in.
Height from track to side sills	2 ft. 7¾ in.
Height from side sills over trolley boards	9 ft. $0\frac{9}{16}$ in.

Height from floor to center of headlining	8 ft. $1\frac{5}{16}$ in.
From track to step	15¾ in.
From step to platform	14½ in.
From platform to floor	8¼ in.
Seating capacity	40
Type of trucks	Brill No. 39-E
Wheel base	4 ft. 6 in.
Size of journal	4 ft. 4 in. by 8 in.
Type of motors	G.E.-98
Total weight, with trucks and air equipment, less electrical equipment	27,200 lbs.

SINGLE-TRUCK CARS FOR ROME, GA.

BRILL No. 21-E TRUCK

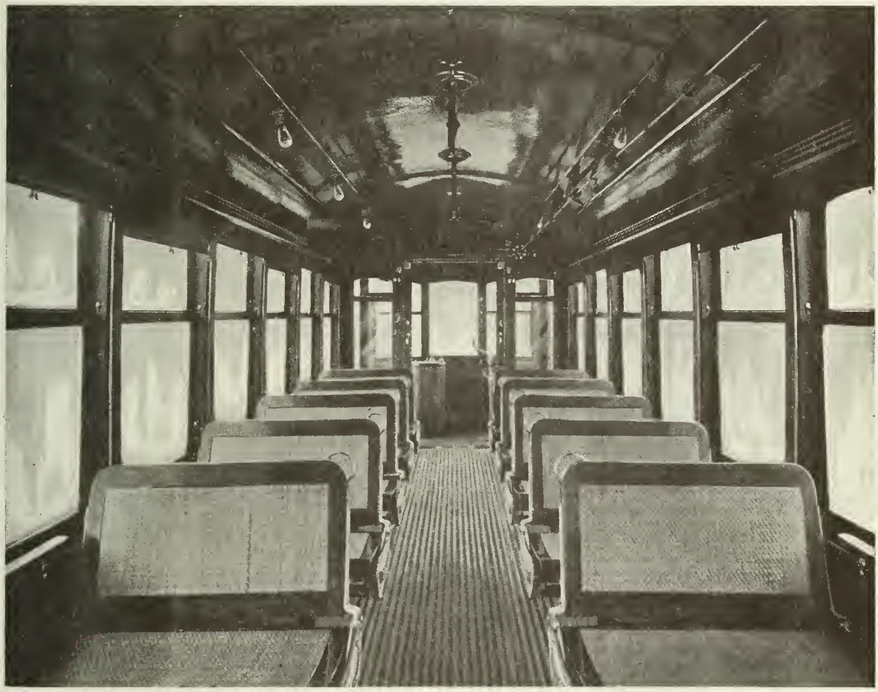
THE Rome Railway & Light Company has lately put in operation a number of single-truck cars, of the type illustrated, built by the J. G. Brill Company. Rome is in the northwestern corner of the state and is the commercial center of a large and populous section. The lines extend to



CARS FOR ROME, GA. The lower side panels are composed of a ¼ in. steel plate extending around to the door posts. No. 14 sheet steel is used for the upper side panels and vestibule sheathing. The cars are mounted on Brill No. 21-E trucks

Lindale, passing De Soto Park, a popular amusement resort controlled by the company. The power station is located at Rome and, besides serving the trolley system, furnishes current for power and lighting.

The cars are of staunch but light construction and are well adapted to the traffic requirements of cities of this class. The bottom framing is composed of long-leaf yellow pine side sills 4¾ in. by 5⅜ in.; end sills of oak, 3½ in. by 6⅝ in.; and oak crossings, 3½ in. by 5⅞ in. A plate of ¼-in. steel is used for the lower side panel and extends the full length of the body and is brought around to the door post at each end. The upper panel is made of No. 14 sheet steel, covered, where the sections join, with oval iron. Side posts of 2¼-in. thickness and corner posts 3⅝ in. form the side fram-



CARS FOR ROME, GA. The upper window sashes are stationary and the lower are capable of being raised their full height. Seating capacity, 28 ing. Steel carlines reinforce the rafters supporting the Brill plain arch roof. This form of roof reduces the weight between 300 and 400 lb. under that of the monitor type, and at the same time is stronger; it also has the advantage of being secure against the invasion of moisture, as the canvas covering is made in one piece. The hoods are detachable.

The vestibule fronts are of the Brill removable type, with the center sash arranged to slide to one side and the side sashes stationary. Three sections of No. 14 sheet steel comprise the dasher and side sheathing of the vestibule. Ground glass is used in the upper sashes of the bulkhead, and the sliding doors are fitted with upper lights of the same to shield the motorman from the glare of lights inside the car. The sliding doors are arranged for individual operation.

Instead of the usual Brill semi-convertible window system, the roof pockets are shallow and permit the lower sash to be raised its full height behind the stationary upper sash. The sash stops permit of adjustment at any desired height. Four Globe ventilators are placed along the center of the roof. "Winner" type of seats of Brill manufacture have wooden slat backs and cushions covered with woven cane, combining neat appearance and durability. Birch stained to the color of mahogany constitutes the interior finish, with Galco board for the headlining.

The principal dimensions and weights are as follows:

Length of body	20 ft.	8	in.
Length over platforms . .	30 ft.	1	in.
Length of platforms . . .	4 ft.	8½	in.
Centers of side posts	2 ft.	8	in.
Width over side sheathing .	8 ft.	0⅜	in.
From track to sills	2 ft.	2⅝	in.
From track to step		17	in.
From step to platform . . .		14	in.
From platform to floor . .		6	in.
Seating capacity			28

Type of trucks	Brill No. 21-E
Wheel base	7 ft. 6 in.
Diameter of wheels	33 in.
Type of motors . . .	G.E. 219—2-25 hp.
Wt. of body less elec. equip.	11,410 lb.
Wt. of electrical equipment	1,240 lb.
Wt. of truck	5.600 lb.
Wt. of motors	5,750 lb.
Total weight	24,000 lb.

THE J. G. BRILL COMPANY

Main Office: PHILADELPHIA, U. S. A.
Cable Address: "BRILL," Philadelphia

London Office: 110 Cannon Street, E. C.
Cable Address: "AXLES," London

American Car Company
St. Louis, Mo.

G. C. Kuhlman Car Company
Cleveland, Ohio

John Stephenson Company
Elizabeth, N. J.

Wason Manufacturing Company
Springfield, Mass.

Danville Car Company
Danville, Ill.

COMPAGNIE J. G. BRILL
49 Rue des Mathurins, Paris
Cable Address: "BOGIBRIL"

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Federico H. Bagge
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C. Dubbelman
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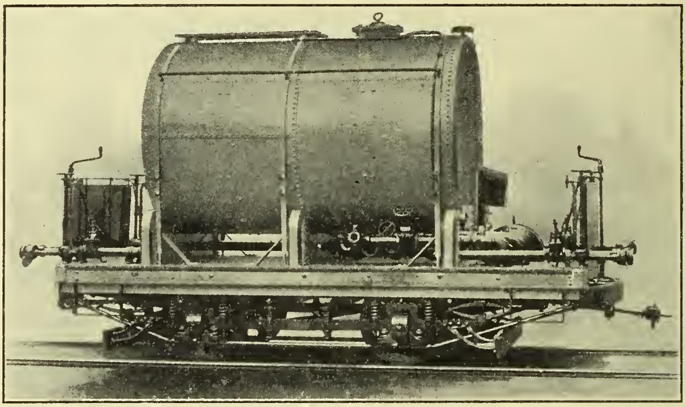

BRILL
"CENTRIFUGAL" SPRINKLERS
(PATENTED)

These cars are built for single- and double-truck operation and with tank capacities of from 2,000 gallons to 5,000 gallons. The illustration shows a 2,400 gallon tank. Pressure at the sprinkling heads is obtained by a centrifugal pump operated by a direct-connected 20 hp. motor. By actual test with two sprinkling heads half open (the requirements for average conditions), 235 gallons of water per minute are discharged over an area of 35 ft. on each side, or a total of 70 ft. Most city streets are less than 50 ft. wide. The amount and range of water are under complete control by the patented type of sprinkling head used and the water can be directed upon any part of the roadway. Gate valves open and close the discharging pipes, so that it is unnecessary to alter the adjustments of the sprinkling heads except on streets of varying widths.

THE J. G. BRILL COMPANY
PHILADELPHIA - - - PENNSYLVANIA

Vol. VI. APRIL, 1912 No. 4

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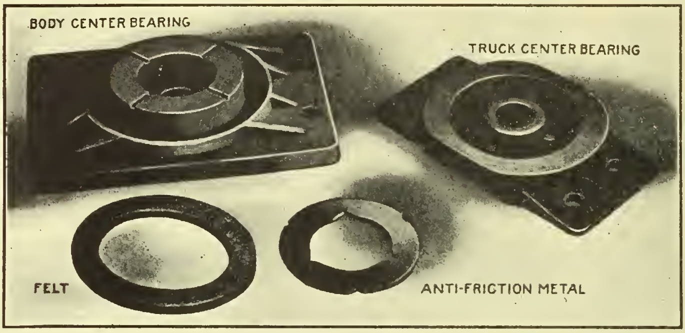
BRILL MAGAZINE

Broad Street
Newark, New Jersey



BRILL OIL-RETAINING CENTER BEARINGS

It is true that center bearings have but slight turn even on the sharpest curve and that the leverage against the center plate is so powerful that the truck would radiate without any lubricant. It is also a fact that a considerable proportion of trucks in use have never had the grease renewed since they were put on the rails. Nevertheless every master mechanic will agree that it is a good proposition to reduce the friction and so lessen the flange and rail wear at curves and economize current consumption. The big operators don't consider it an unnecessary refinement of advanced operating methods. Some have even gone in for ball-bearing center plates, but the weight of the car is too great for the ball races to stand the pressure without becoming scored and pitted, so they invariably come back to the frictional plates of which the Brill Oil-Retaining Center Bearing is the one improvement over the old style grease lubricated plates. A phosphor-bronze ring constantly in a bath of oil (a gill lasts a year and a half) takes the wear and a felt ring keeps out dust.

THE J. G. BRILL COMPANY

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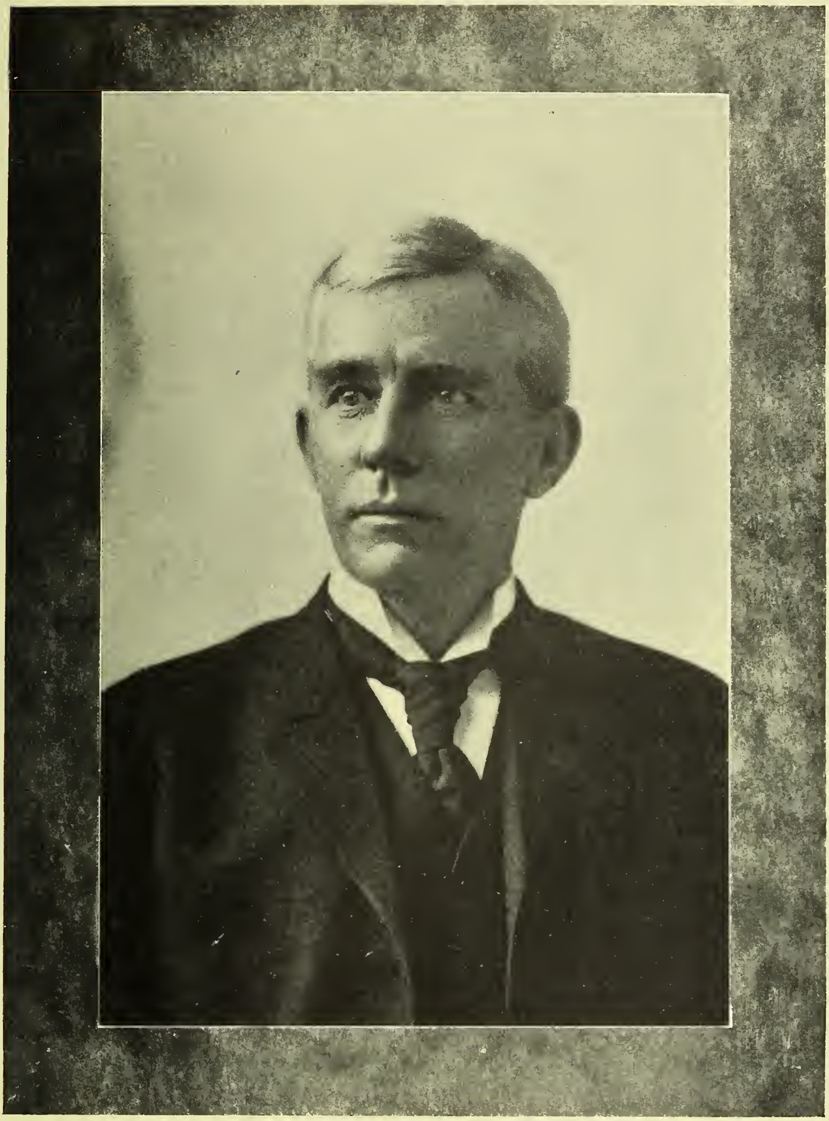

J C Hutchins

President, Detroit United Railway

BRILL MAGAZINE

Vol. VI APRIL, 1912 No. 4

J. C. HUTCHINS

[WITH PORTRAIT INSERT]

JERE CHAMBERLAIN HUTCHINS, President of the Detroit United Railway, was born in Carroll Parish, La., October 13, 1853. His boyhood was spent in Lexington, Mo., where he was educated in the public schools. After a course in civil engineering he commenced his railway career as construction engineer on the Missouri, Gulf & Lexington Railway, and for a number of years continued this work on various Missouri and Texas railroads. From 1876 to 1881 he was a reporter on the *Waco Examiner*. The following thirteen years he served on the engineering staff and in other capacities with the New Orleans & Pacific, Missouri, Kansas & Texas, Louisville, New Orleans & Texas, and Illinois Centrol Railway Companies. In 1894 he was elected secretary and treasurer of the Detroit Citizens' Street Railway, and when the Detroit Railway Company was acquired was elected to the same position in that company. Later, upon the organization of the Detroit United Railway, he was made vice-president and general manager, and on January 21, 1902, was elected president. Largely through his initiative and under his management the city lines and the interurban systems radiating from Detroit, comprising in all over 800 miles of electric railways, have been brought under one control. His administration has been marked by the introduction of radical improvements in all directions of the service. Mr. Hutchins was president of the American Street Railway Association, 1903-04, and is a member of the American Society of Civil Engineers.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

NEWARK, N. J.*

NEWARK, the metropolis of the State of New Jersey, situated on the Passaic River 8 miles west of New York City, has a population of 350,000 and a total area of 23½ square miles. The river frontage is 10½ miles, with channel 16 feet deep at low water and 300 feet wide. The ground is generally level, but rises gradually toward the western part. Two large and beautifully laid-out parks and a number of smaller ones have a total area of 661 acres. The city is served by the Pennsylvania, Lehigh Valley, Erie, Delaware, Lackawanna & Western, and the Central of New Jersey Railroads, and, in the handling of freight, by steamboats engaged in coastwise and river commerce. By the electric lines of the Public Service Railway Company it is connected with the cities and towns within a radius of twenty miles, including Jersey City, Hoboken, Paterson, Passaic, Elizabeth, New Brunswick and other manufacturing cities and the numerous residential towns and suburbs. Newark has long been one of the leading manufacturing centers of the country and ranks eleventh in this respect. The principal products are leather, felt hats, jewelry, malt liquors, clothing, shoes, chemicals, varnish, stamped ware and hardware, and it has large foundries and machine shops, establishments for smelting and refining lead and copper, slaughtering and meat packing. The city is also the headquarters for five or six of the largest life and fire insurance companies of the country.

The Public Service Railway Company operates all of the lines in Newark, amounting to 102¼ miles, and furnishes a

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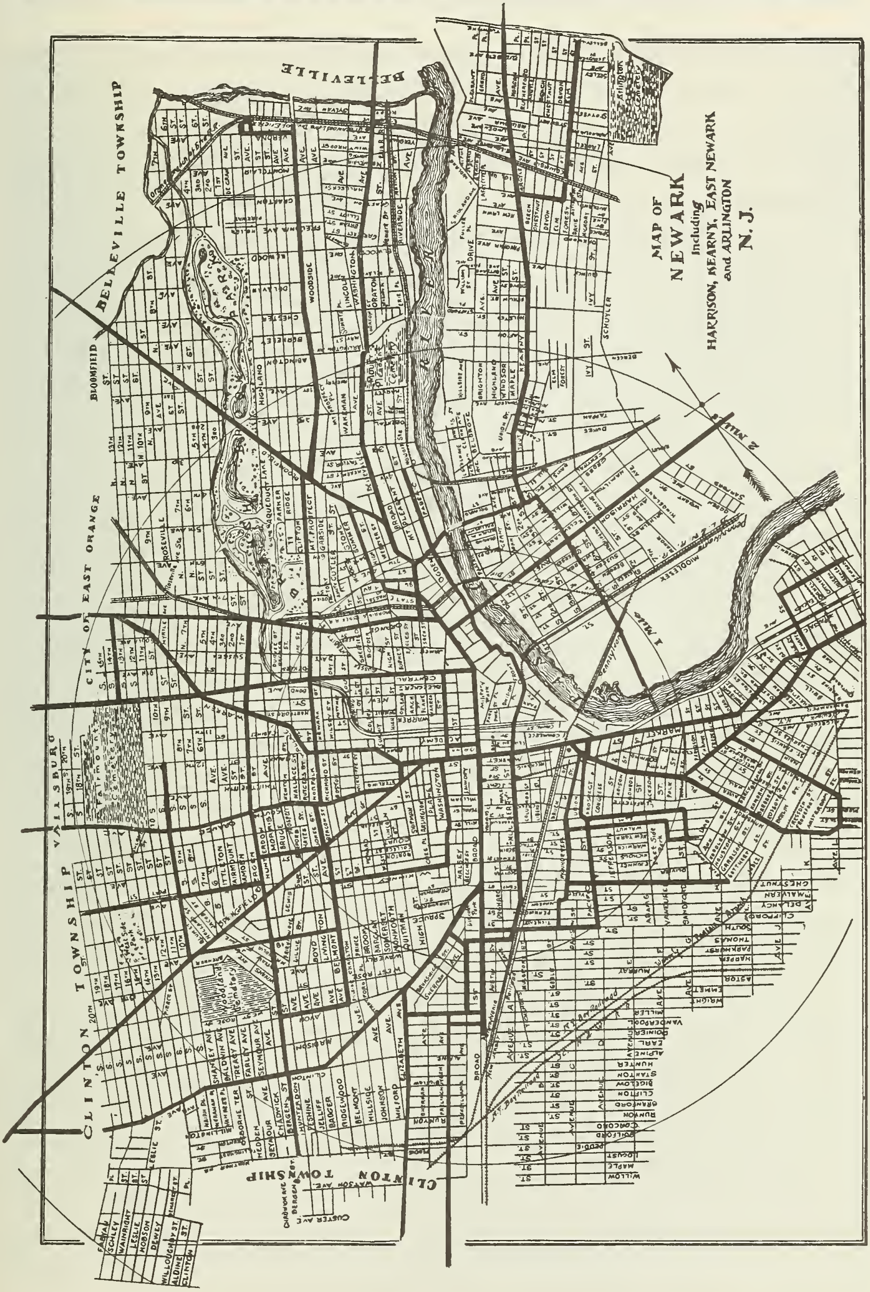
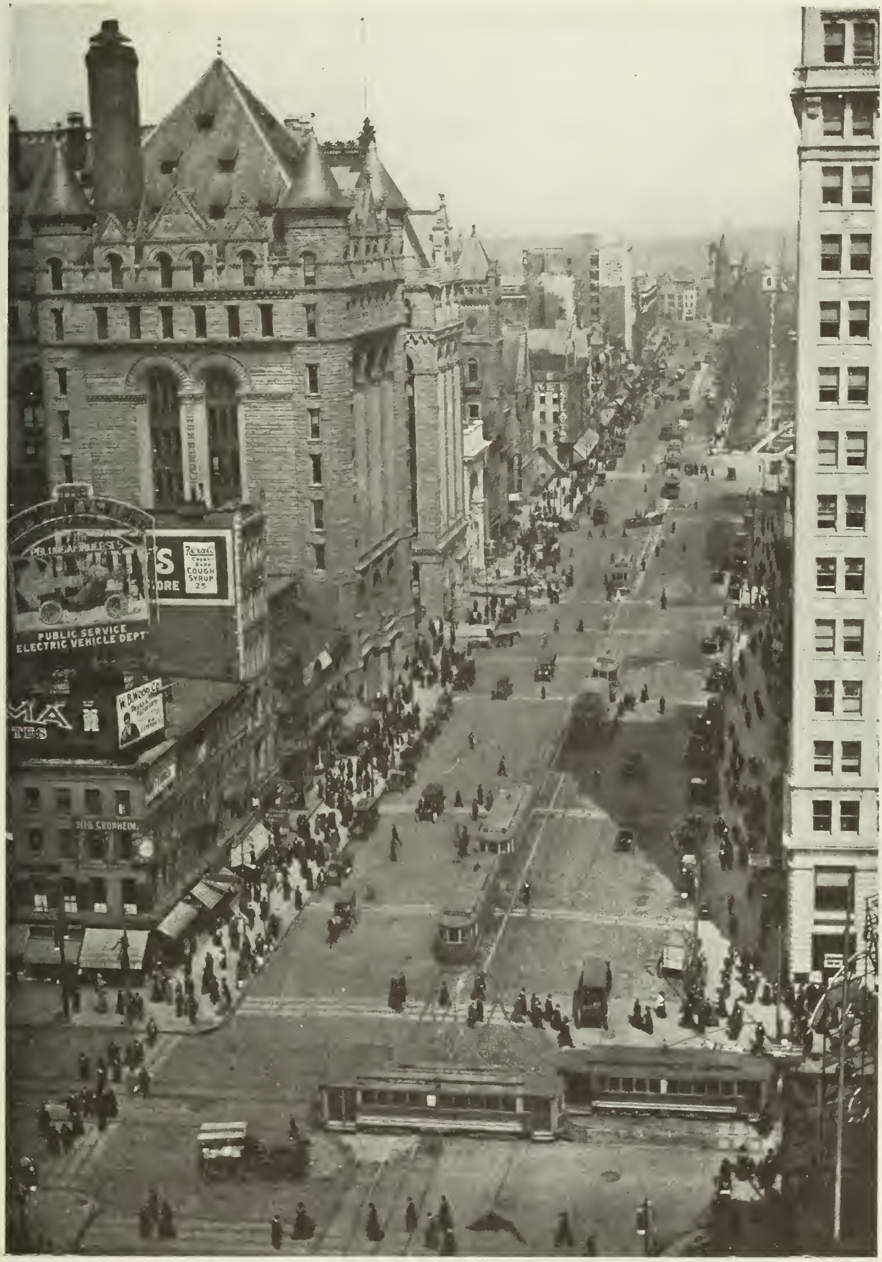
* The fortieth article of the series.


MAP OF
NEWARK
Including
HARRISON, KEARNY, EAST NEWARK
and ARLINGTON
N. J.
BELLEVILLE TOWNSHIP
BELLEVILLE
CITY OF EAST ORANGE
VAILSBURG
CLINTON TOWNSHIP
CLINTON TOWNSHIP
1 Mile
2 Miles

service that is distinctly modern and efficient in every respect. The city lines form the center of what is known as the Essex Division, comprising 27 lines, of which 8 lie wholly within the corporate limits and 14 carry the traffic of the surrounding communities to and from the city, while 5 do not touch Newark, although they connect with other routes which do. Starting at Broad and Market Streets, one can travel to any part of the city and to any part of the company's great network of lines throughout the State. The "Four Corners," as this central crossing is called, is said to be the second busiest corner in the United States, the first being the intersection of Broadway, Sixth Avenue and Thirty-fourth Street, New York.

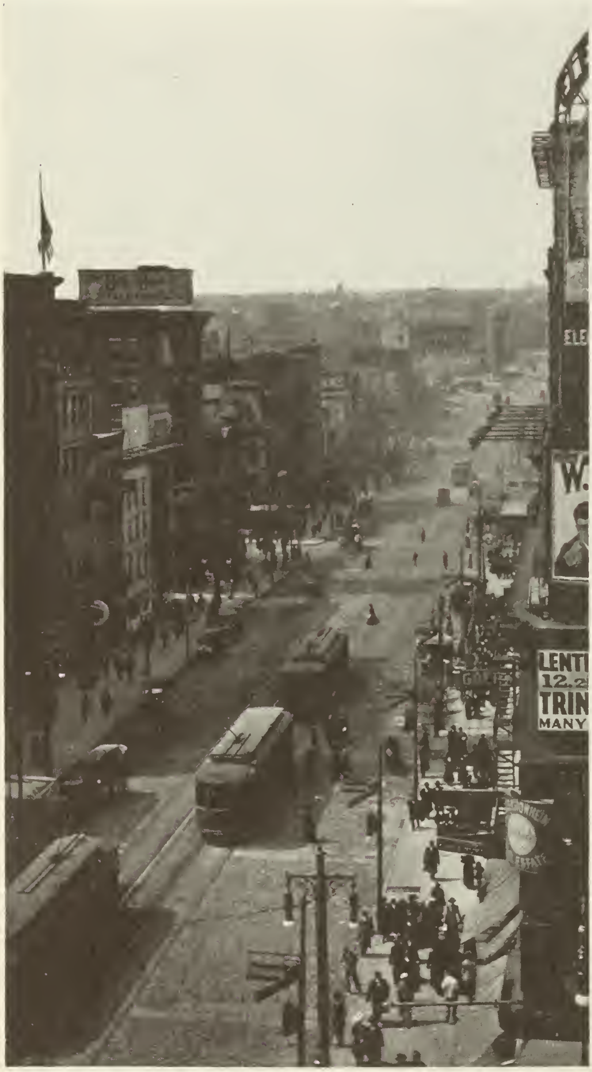
The fact that 14 out of the 21 lines in the city cross or turn at the "Four Corners" complicates the traffic situation, and a second problem is that of having but one rush period, and that in the evening between 5.00 and 6.30, during which time the company carries approximately 70,000 passengers. What would naturally be the morning rush hour covers a period of three hours, from 6.00 to 9.00. The explanation of the limited evening rush period in Newark is that there are thousands who walk to their places of business in the morning, and the different hours of starting work at the factories and business houses spreads the traffic over several hours, while the closing time for most classes of business is within the ninety minutes beginning with 5.00. This means that probably one-third more people ride in the evening than in the morning and in one-half the time. From recent records it is shown that 515 cars cross the Broad and Market Streets intersection during the hour from 5.30 to 6.30 in the evening, an average of 9 every minute. During the same hour there is an average of 900 vehicles passing this point, and with the thousands of pedestrians crossing, makes the congestion worse than at any point in the country except that at Broadway and Thirty-fourth Street, New York.

A semaphore system, installed last year at the "Four

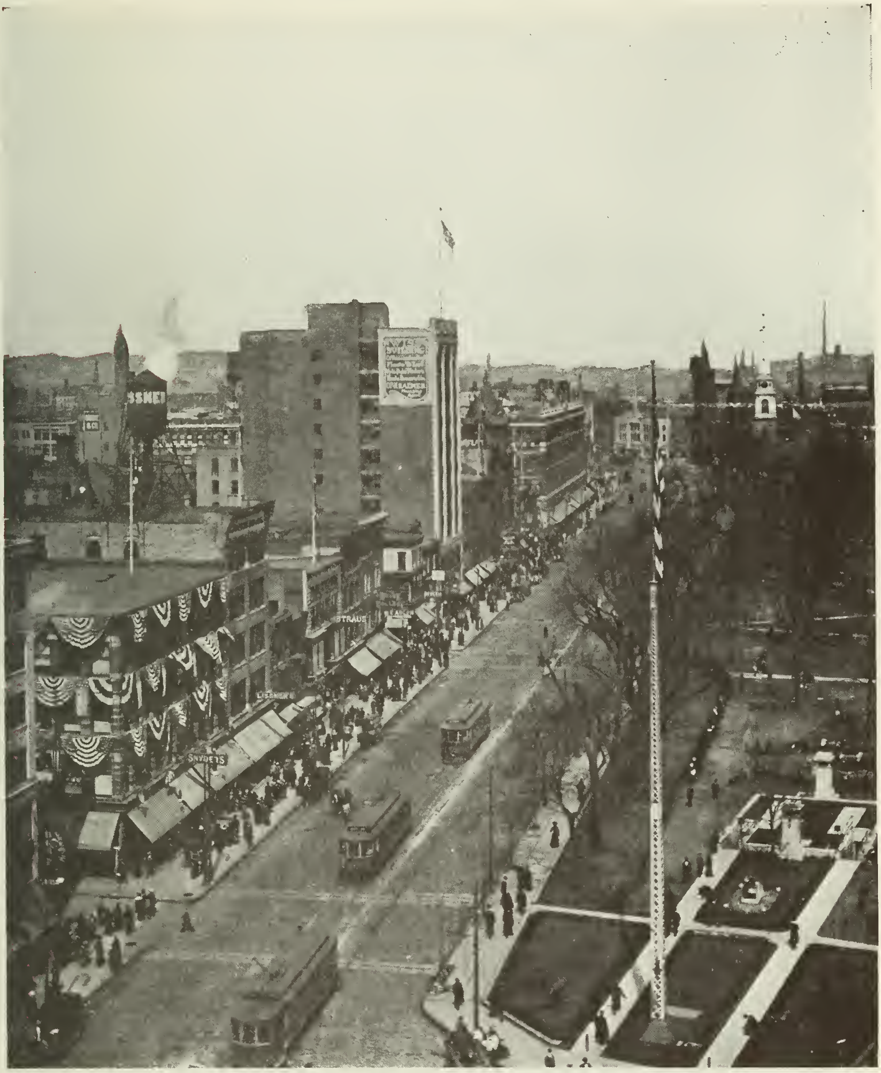


Newark Traffic Conditions and Cars. Broad Street at the intersection of Market, the point of greatest traffic congestion on the system. Public Service Railway Building is second large building on left

Corners," on the north side of Market Street, has made it possible to move more cars across the intersection during the rush hour than formerly. The conditions are such that it is practically impossible to add to the number of cars crossing this point. The company has used every effort to relieve the situation by not allowing the cars to stop at street crossings within a block of the intersection during the rush hour, by putting on tripper service on some of the lines, by loading some of the cars at points a square or two away, and by running extra cars through adjacent streets. As almost the entire Essex Division is affected by the inability to get more cars past Broad and Market Streets, remedial measures must be taken in the near future; how soon,

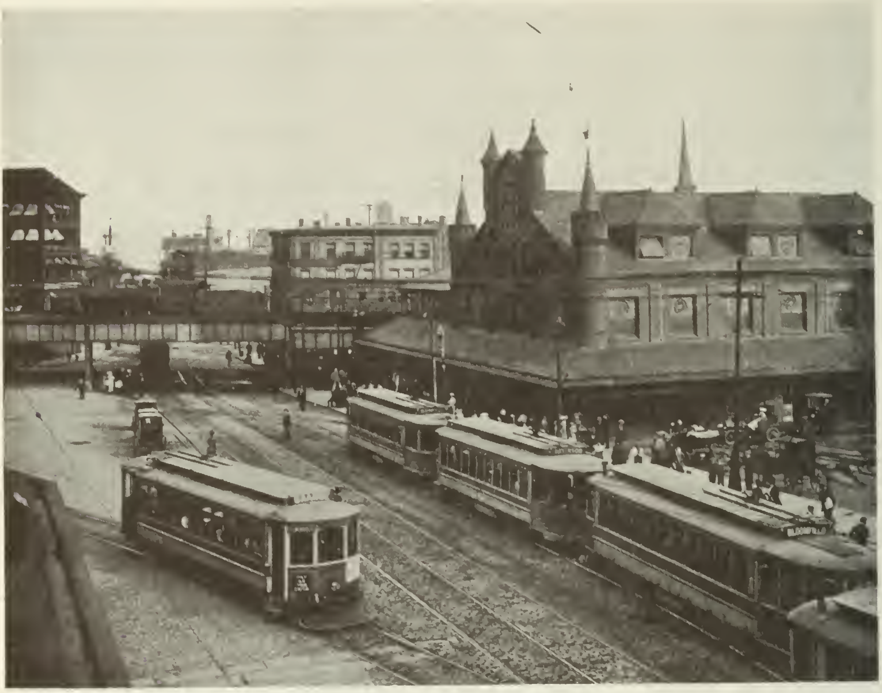


NEWARK TRAFFIC CONDITIONS AND CARS. Looking west on Market Street from Broad. Semaphores are shown about curb in foreground



Newark Traffic Conditions and Cars. Broad Street at the retail shopping district. These lines are crowded with cars during the evening rush hour

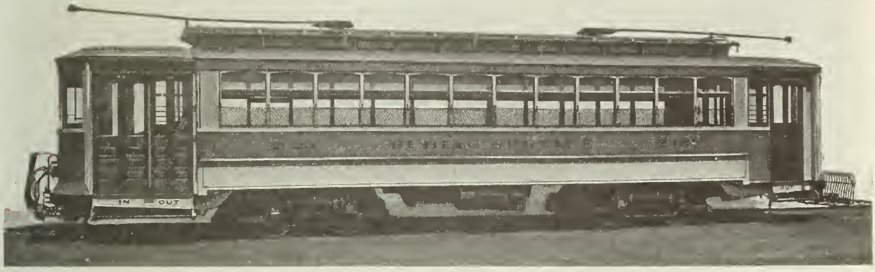
depends upon the action of the municipality. Two plans have been suggested, one for a subway system and the other for the construction of four streets surrounding the business center of the city in the shape of a diamond. While either would relieve the present situation, both will probably be necessary in a few years.



NEWARK TRAFFIC CONDITIONS AND CARS. Market Street at Pennsylvania Railroad Station. The cars of a number of the principal lines turn at the loop in front of the station

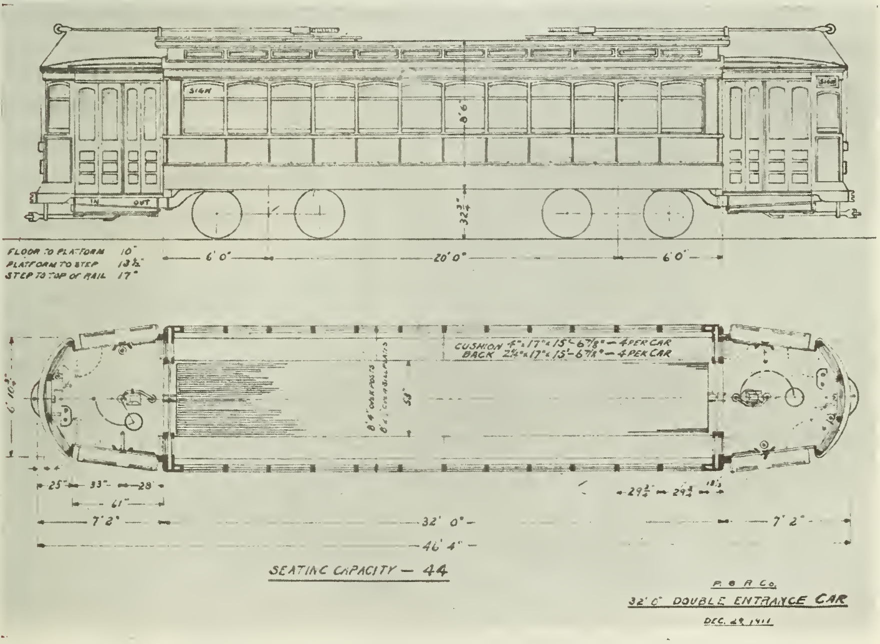
The car equipment for the Newark lines consists mainly of the single- and double-end cars illustrated, of which the double-end type may be considered as the standard. With the exception of the cars operated on long lines where fare zones are established, all are of prepayment type. The standard car has a 32-ft. body, 7-ft. 2-in. vestibuled platforms having folding doors, and longitudinal seats having a seating capacity of 44. Total weight, with trucks and complete equipment, 45,600 lbs.

The bulkhead doors slide into pockets, leaving a 4-ft. opening divided at the center into entrance and exit passageways by a platform railing which surrounds a fare box. The entrance is closed with a two-leaf door which folds against the controller, and the exit at the same side of the platform has also a two-leaf door which folds against the body end. The exit door on the opposite side of the platform folds against



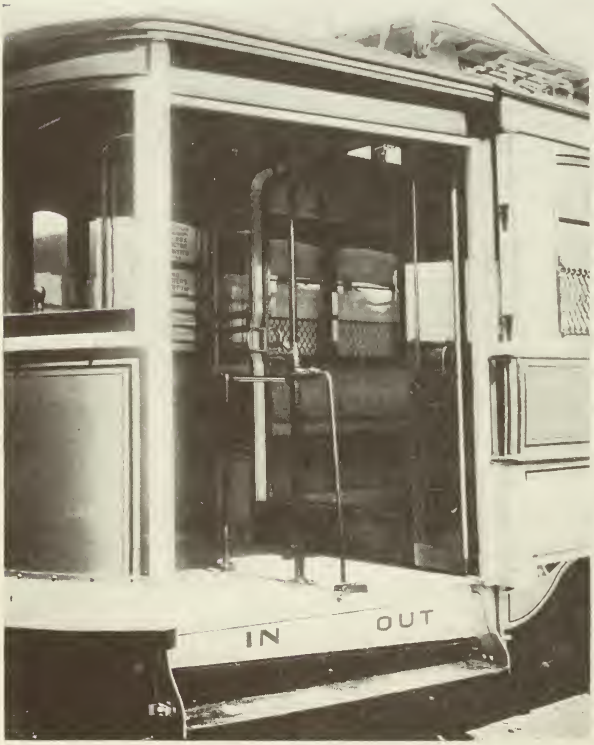
NEWARK TRAFFIC CONDITIONS AND CARS. Standard car of the Newark lines mounted on Brill No. 27-G1 trucks

the hand-brake wheel. Each of the doors has a grab handle on the inside. One-half of each door is pivoted at the side on a shaft which extends through the platform floor, and the other half of the door has a roller at the top which runs in a slotted guide above the door opening. The pivot shaft is connected by levers and rod under the platform to a shaft

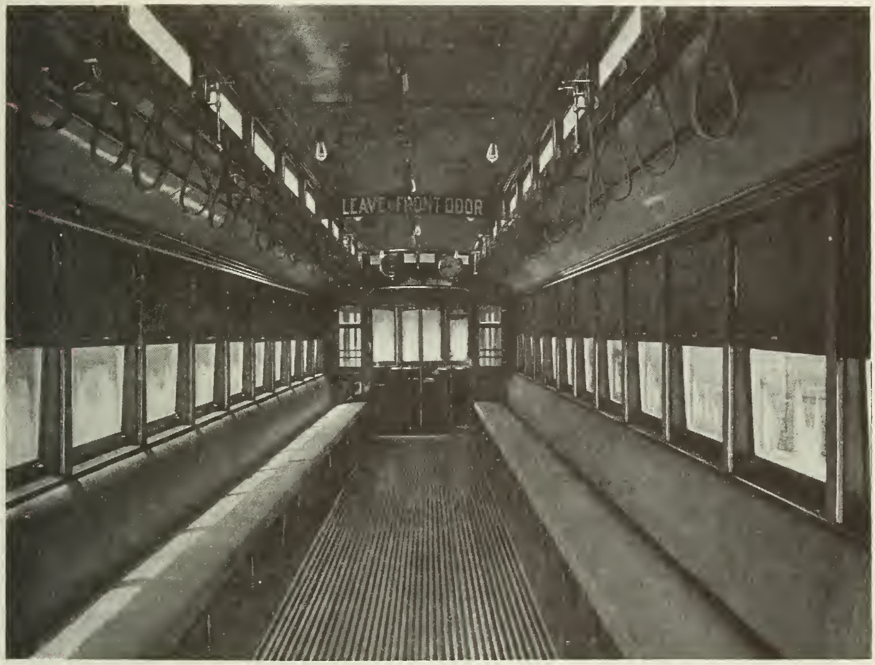


NEWARK TRAFFIC CONDITIONS AND CARS. Plan of the above car, showing arrangement of prepayment platforms at the center of the platform which has operating handles over the railing near the fare box. The exit door, controlled by the motorman, is of the same type as those on the other side of the platform and has its operating handle over the brake wheel. The platform steps are all stationary and are not protected by covers. The upper window sashes are stationary and the lower raise their full height.

The underframing consists mainly of 7¾ by 4-in. yellow pine side sills, reinforced with a steel plate 18 by ¼ in., which forms the lower side panel and is brought around the ends of the car to the door posts. No center sills are used. The crossings are 3¾ by 6 in., with ¾-in. tie rods at each crossing. The end sills are 5¼ by 6⅞-in. white oak timbers reinforced with 6 by ½-in. knee plates at the corners. A continuous steel angle, 3½ by 3 by ⅜ in., is bolted to the side sills just outside the bolster for a distance of 25½ in. and is then bent inward at an angle of 45 degrees to the inside face of the end sill, against which it has a bearing of 38 in. The bolsters are of cast

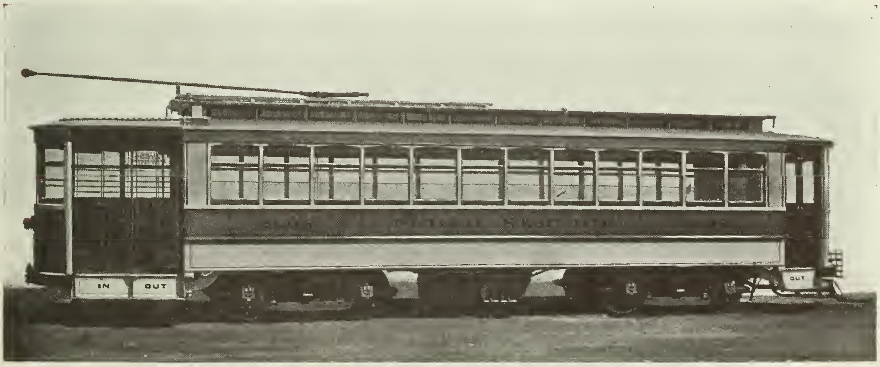


NEWARK TRAFFIC CONDITIONS AND CARS. Prepayment platform of double-end car. Conductor operates entrance and exit doors by handles on central standard



NEWARK TRAFFIC CONDITIONS AND CARS. Interior of car shown on preceding pages. The heavy traffic, especially during the evening rush hour, calls for longitudinal seats

steel with shouldered ends on which the side sills rest. The platforms are mainly supported on two 3 by 5 by ½-in. angle center sills and two 3½ by 7 by ½-in. angle side sills. The body posts are of ash 2 by 3½ in.



NEWARK TRAFFIC CONDITIONS AND CARS. Car for single-end operation with wire screen doors at rear. Mounted on Brill No. 27-M. C. B. 1 trucks

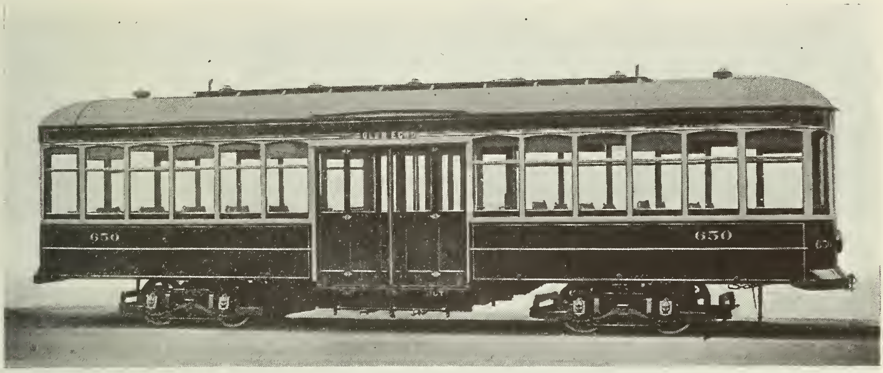
THE WASHINGTON CENTRE ENTRANCE CAR

ONE of the most interesting cars of the centre entrance type that has ever been built was recently completed by The J. G. Brill Company for the Washington Railway & Electric Company, and has been named and will be known in the future as "The Washington Centre Entrance Car." The car was designed by Mr. W. A. Wenner, master mechanic of the railway company, and was originally planned several years ago, but had been held in abeyance.

The purpose of this new type is to afford a car of easy access with comfortable low steps and a roomy centre entrance and exit, to increase the seating capacity and furnish extra features for the comfort and safety of passengers. The company has always given much attention to its rolling stock, and in its efforts to provide cars of a high standard has, from time to time, adopted the best features brought out in the progress of street car development. This policy was adopted many years ago, as it was realized that the patrons of the lines were keenly appreciative of the advances made for their safety and comfort.

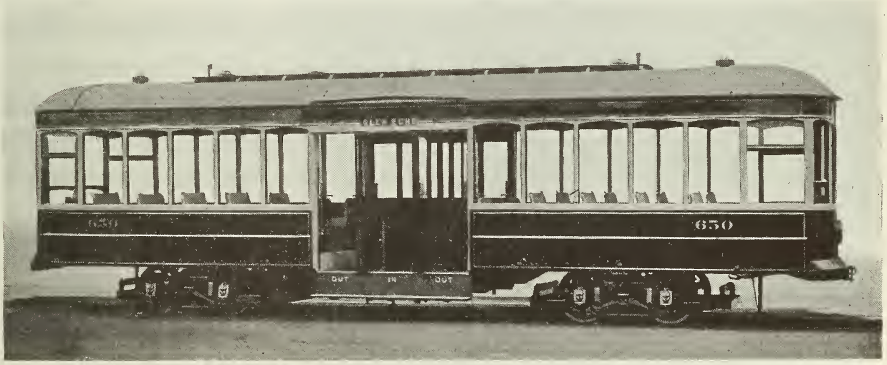
The new car has seats, aisles, passageways and doors of generous dimensions, is conducive to rapid loading and unloading, and provides more seats, more conveniences and greater safety.

The seating arrangement of the car, as shown in the illustrations, accommodates 53 passengers, 16 more than the company's cars of the same over-all dimensions. The 16 extra seating places are accounted for by the fact that seats are along each side for the entire length of the car, with the exception of the entrance and exits at one side. The arrangement provides for 36 of the passengers facing forward, 4 facing backward and 13 facing sideways. In a single-end car



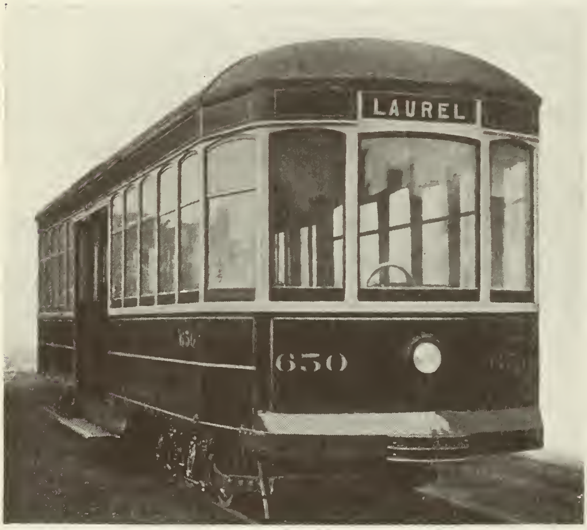
The Washington Centre Entrance Car. The car is carried low on Brill No. 27-GE1 trucks, the standard type of truck of the system

of this type a seat would be placed across the rear end, adding accommodations for 4 additional passengers. The transverse seats are of the Brill "Winner" type and have pressed steel pedestals, aisle and wall plates. The longitudinal seat in the central section is of solid mahogany and made in two parts, each of which folds at the door stanchions, so that when the doors are opened they swing back against the seat and both occupy very little space. The doors are of a novel and interesting type and are made in two sections of three parts each, the middle part of each section being pivoted on a shaft which extends down through the floor and is connected with a rod and bell crank to a standard with operating handle at the far

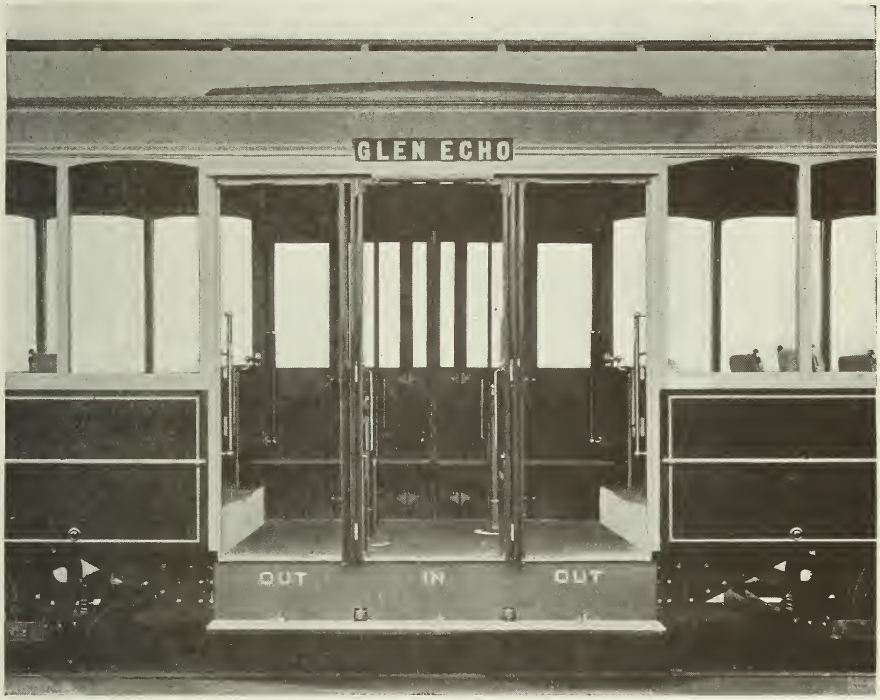


The Washington Centre Entrance Car. A roomy centre entrance and exit is provided without sacrificing seating capacity. The car is perfectly adapted to summer service by the Brill semi-convertible window system side of the vestibule. Both doors are opened and closed from one shaft by a half turn of the handle. The step also works in conjunction with the doors. The step has a spring counterbalance, and the leverage obtained by the bell crank connection to both sections of the doors and step enables the conductor to operate the handle with comparatively little effort. Attention is directed to the ingenious method of folding the three-part doors together by means of the pivotal shaft which turns the central part and the rollers at the tops of the outer leaves moving in guides; the arrangement is simple, effective and strong. Bronze grab handles are attached to the door stanchions, which are located close to the shafts on which the doors pivot. From pavement to step tread is but 13 in., and from step tread to vestibule floor is also 13 in. From vestibule floor to car floor is 10 in.

The window system is of the improved Brill semi-convertible type, in which the sashes are hinged together instead of the lower sliding behind the upper and telescoping into the roof pocket. The hinged sash arrangement is permissible in the Brill Plain Arch Roof because of the deeper pockets. The hinge between the sashes and the stiles of both sashes are made of brass with the glass set in rubber. The high window openings give an unusually bright



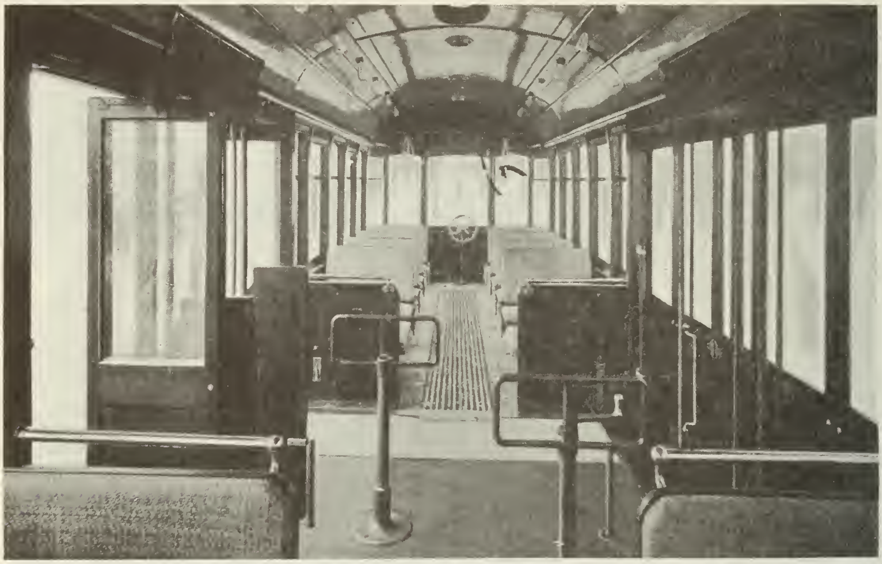
The Washington Centre Entrance Car. The straight lines of the body and the long sweep of the Brill Plain Arch Roof gives a distinctly modern appearance to the car. Note the extra wide centre sash and unusually free outlook for motorman



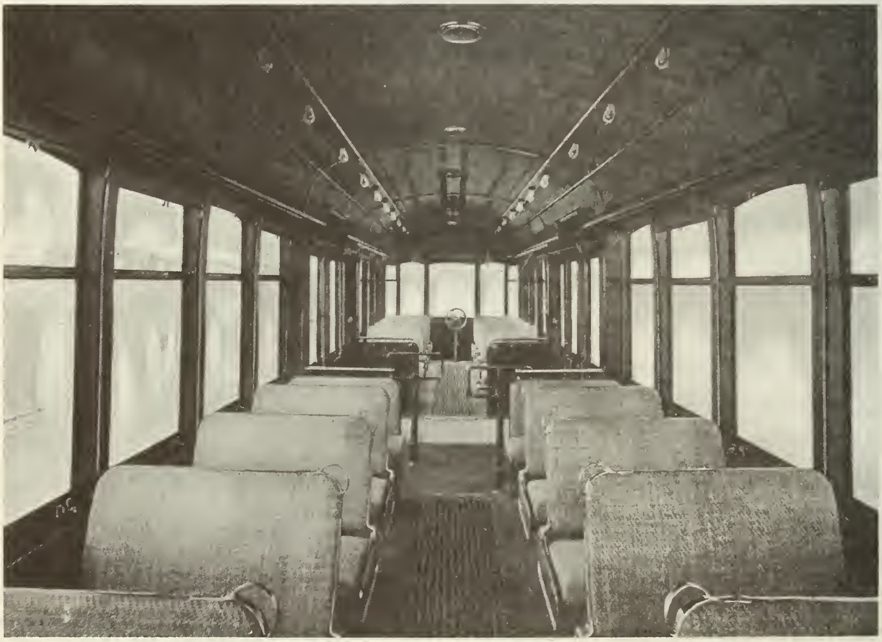
THE WASHINGTON CENTRE ENTRANCE CAR. The step heights from pavement to main floor are respectively 13, 13 and 10 in. The doors and step are operated by a half turn of the handle on the standard at the far side

and attractive appearance to the interior of the car, and in warm weather, when all of the windows are raised into the roof pockets, the car is remarkably open and airy. The sashes can be held at any desired height and, therefore, the passengers may have as little air or as much air as they please. The end windows drop into pockets and may be held at any desired height by the Brill Vestibule Sash Adjusters, with which they are equipped. When the windows are closed ventilation is obtained by six Globe ventilators placed along the centre of the roof. Ceiling is composed of Agosote and extends to an arch which crosses the car at the last window posts. The roof, outside of this arch, is carline finish.

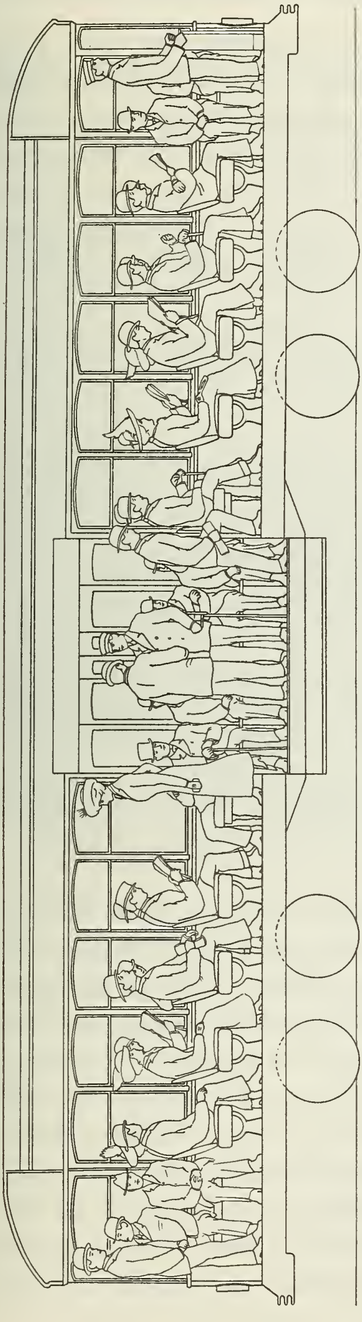
The car is to be equipped with a heating and ventilating system recently devised, which pumps foul air out of the car



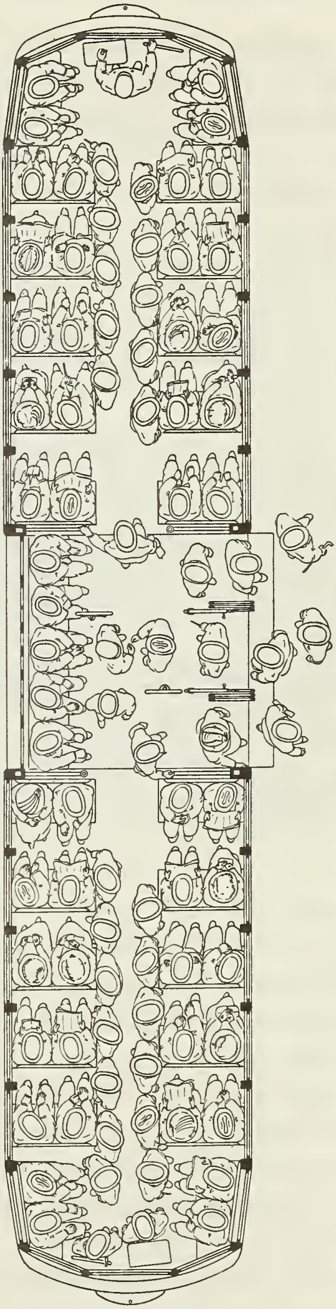
THE WASHINGTON CENTRE ENTRANCE CAR. The folding seats, when turned in an upright position and the wide grab handles at the top of the standards form partitions to separate incoming and outgoing passengers



THE WASHINGTON CENTRE ENTRANCE CAR. The wide aisle and high windows are conspicuous features. The fare register is placed on the bracket at the centre of the ceiling

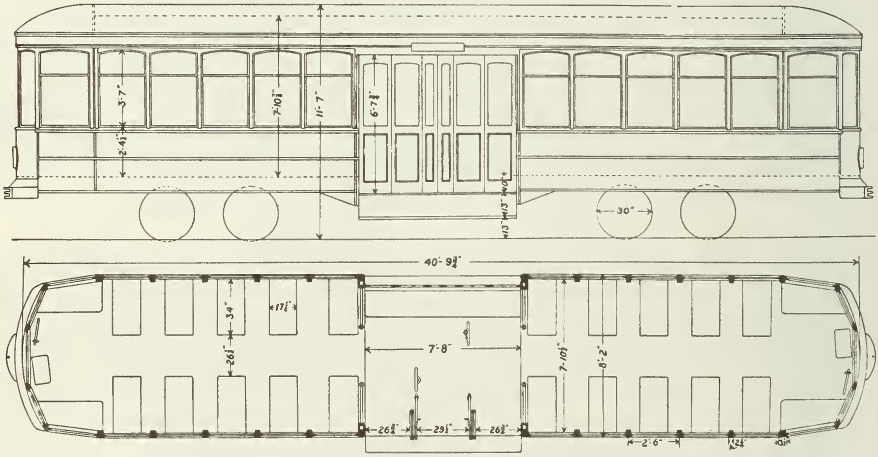


THE WASHINGTON CENTRE ENTRANCE CAR. Elevation through center of car



THE WASHINGTON CENTRE ENTRANCE CAR. Bird's-eye view of car showing 53 passengers seated, of which 36 face forward, 13 face sideways and 4 backwards; 25 are standing in the aisles, 6 are entering and 6 leaving and supplies fresh air heated to the proper temperature. Push buttons operating a buzzer are placed on each window post. The doors are equipped with an automatic starting signal switch, invented by Mr. Wenner, which gives one stroke on the signal bell when the doors start to open and two strokes just before they reach their closed position. This device does away with the signal cord and its positive operation adds an important factor of safety.

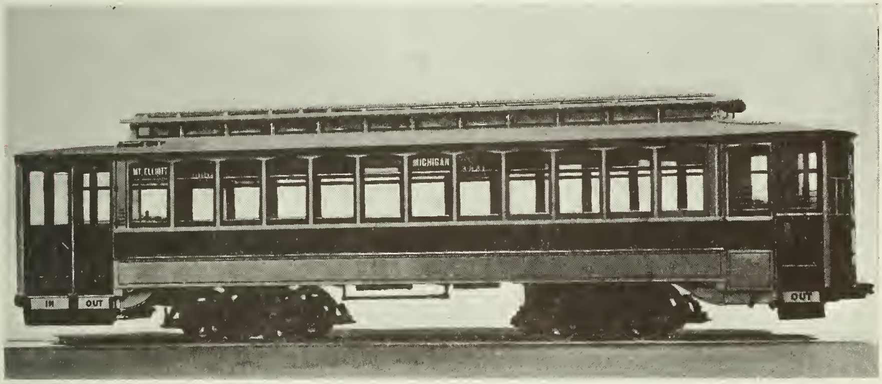
The main side members of the underframing are composed of 15 by ⅜-in. steel plates extending from the end to the door post and connected under the centre vestibule by 10 by ⅜-in. plates, to which they are riveted, and this centre plate is reinforced by steel channels and gusset plates. The stringers consist of 3-in. 5.5-lb. I-beams. Yellow pine side sills 4 by 7¾ in. are also used. The crossings are of white oak 4½ by 10 in. and 4½ by 3 in., and the end sills are 4½ by 6 in. Brill angle iron bumpers protect the ends of the bottom framing and have a 2-ft. length of Hedley anti-climber at the center, with a hole drilled through the same for a drop-pin for connecting a portable drawbar. The side posts are 2½ in. thick and the corner posts, next to the entrance, 3½ in. Pressed steel carlines support the roof.



THE WASHINGTON CENTRE ENTRANCE CAR. Side elevation and floor plan showing general dimensions

ONE HUNDRED AND THIRTY-FIVE CARS FOR THE DETROIT UNITED RAILWAY CO.

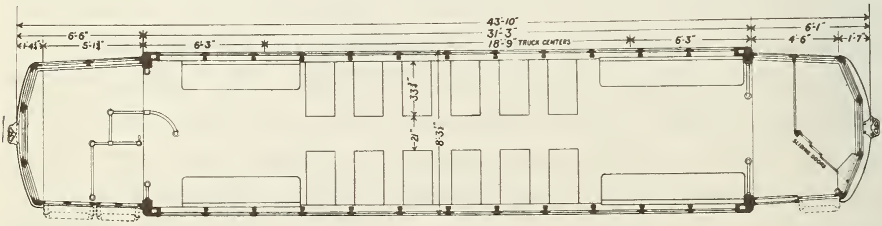
THE Detroit United Railway Company has lately put on its lines 85 cars of the type illustrated, built by the G. C. Kuhlman Car Company, and 50 more of these cars will be delivered shortly. The design of these cars represents the most exhaustive investigation of requirements of the traffic conditions of Detroit, and, when the first lot of 35 were received and put in operation, the design and construction were so completely satisfactory that two orders of 50 cars each were soon placed. The new type has been consistently developed through a long period, commencing with the "Detroit Platform" as far back as 1900. The railway lines were wisely laid out for single-end car operation, and it naturally followed that a motorman's compartment with diagonal partition was an early feature. The seating arrangement has undergone various changes, and that shown in the diagram has proved of greatest merit by affording ample room for standing passengers at front and rear between the longi-



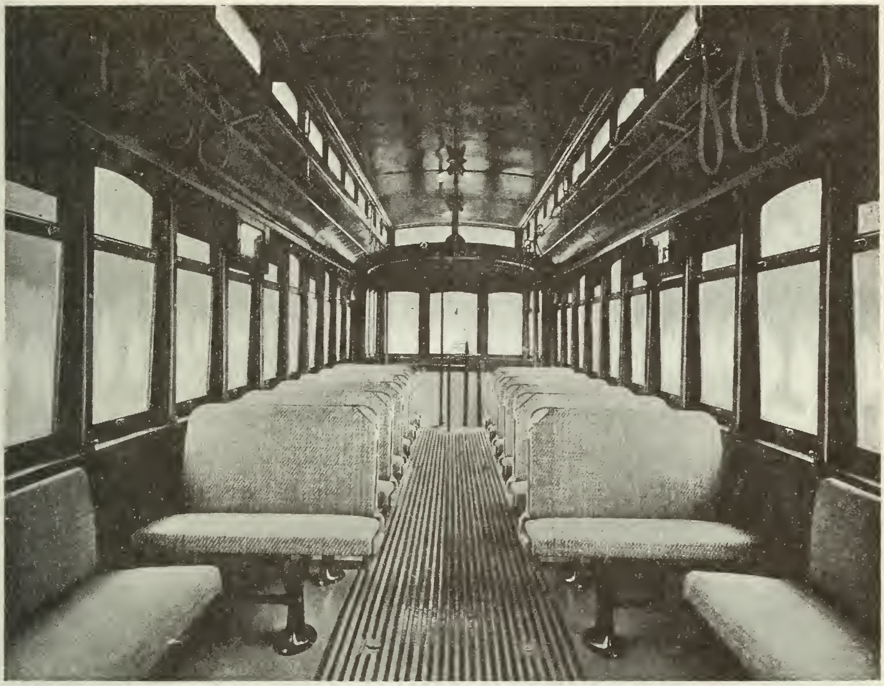
CARS FOR DETROIT. Prepayment car for single-end operation adopted as the standard type of the Detroit lines. Car mounted on temporary trucks for photographing tudinal seats, and almost equally dividing the number of passengers facing forward and those facing sideways, 22 being accommodated on the longitudinal seats and 24 on the transverse seats. The cutting off of the rear longitudinal seats to prevent the obstruction of the passageways by seated passengers is also well planned. The platform railing is of unusually interesting design; it increases the platform space for entering passengers, circumscribes the motorman's position, increases the platform space at the exit door, and provides grab handles, exactly where they are needed. The omission of the bulkhead makes possible this arrangement of the railing. Two handles on a standard, which is part of the platform railing, operate independently the entrance and exit doors with their folding steps.

The front platform has standing space for 8 passengers without crowding, and so, when coming to a stop, those who intend to alight can collect close to the front exit door and be ready to step down without delay. The front door slides back into a pocket and is operated in conjunction with the step from a handle in the motorman's compartment.

The car is well provided with signs, having a large destination sign occupying the upper half of the front window next the exit and signs in the upper sashes at the center and next the rear corner post on each side. Quarter-sawed white oak in natural color is used for interior finish and head-



CARS FOR DETROIT. Arrangement of platform railing gives ample space for incoming and outgoing passengers and furnishes convenient grab handles. Rear doors open independently from conductor's position. The transverse seats accommodate 24 passengers and the longitudinal seats, 22



Cars for Detroit. Bulkheads are omitted at both ends of the car, permitting the arrangement of the railing at rear shown on diagram on opposite page and reducing weight. Route signs in upper sashes at centre and rear side windows at both sides of the car

linings. The upper window sashes are stationary and the lower drop into pockets which have hinged covers. The seats are 33¾ in. long and have 18-in. backs with corner grab handles. Hand straps are provided over the longitudinal seats.

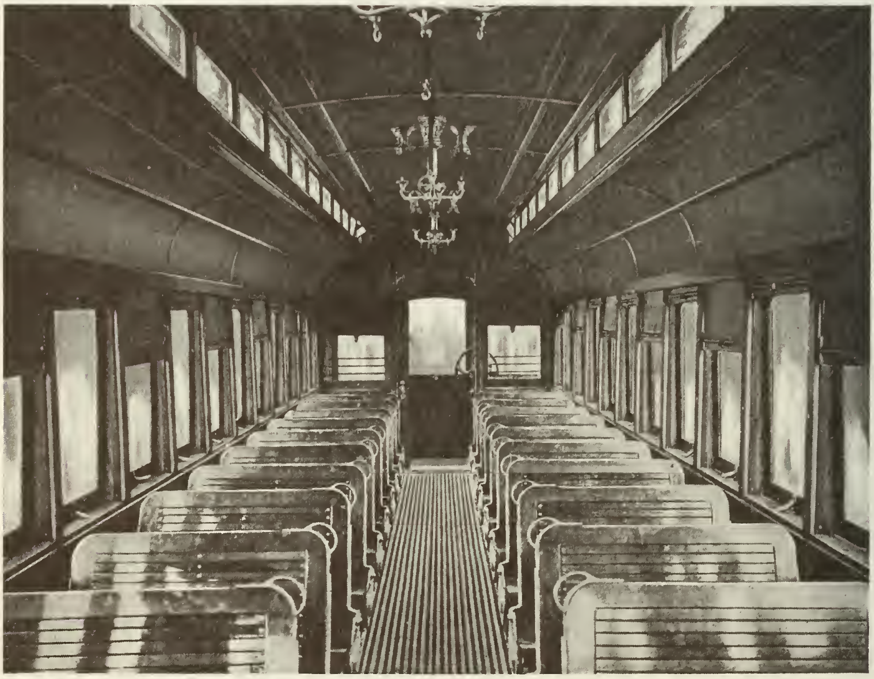
The principal dimensions and weights of the cars are as follows:

Length over corner posts	31 ft. 3 in.	From track to side sills	2 ft. 9 in.
Length over platforms	43 ft. 10 in.	From floor to headlining	8 ft. 2½ in.
Length of front platform	6 ft. 1 in.	Track to step	15 in.
Length of rear platform	6 ft. 6 in.	Step to platform	14 in.
Centers of side posts	2 ft. 5¾ in.	Platform to floor	11 in.
Width over posts	8 ft. 3½ in.	Seating capacity	46
Extreme width	8 ft. 6 in.	Weight of car body less elec. equipment	18,160 lb.
From side sills over trolley boards	9 ft. 3⅝ in.		

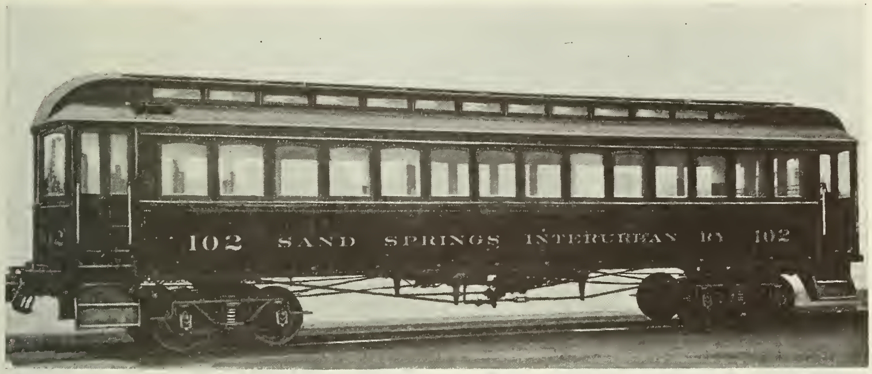
TRAILER CARS FOR SAND SPRINGS INTERURBAN RAILWAY TULSA, OKLA.

PASSENGER AND BAGGAGE TYPES

THE Sand Springs Interurban Railway is a comparatively new line, running out of Tulsa, Okla., and was first operated by large gasoline-motor passenger cars. The American Car Company recently furnished passenger and baggage cars of the types illustrated, which are hauled by the gasoline-motor cars and were much needed to supplement the former equipment in the rapidly developing traffic of the line.



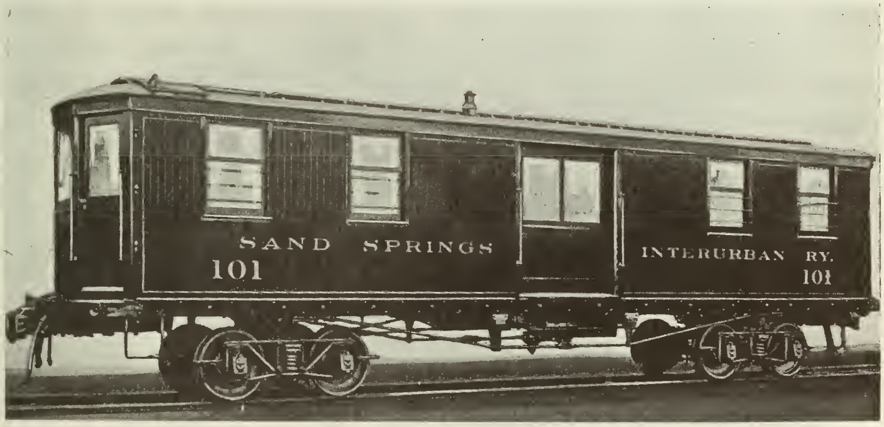
Cars for Sand Springs Interurban Railway. The plain interior is well suited to pioneer service on this new system



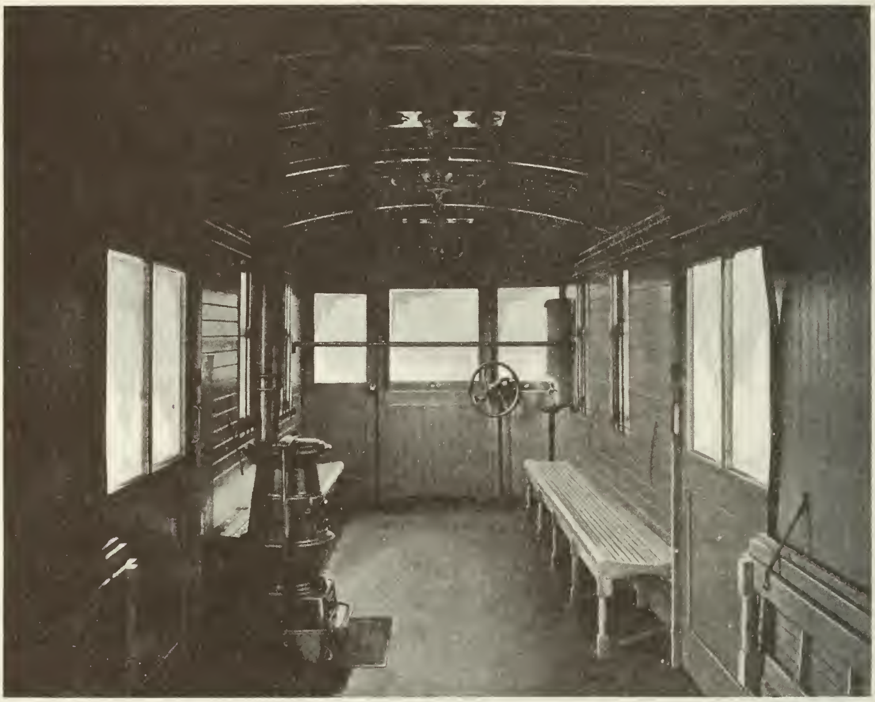
Cars for Sand Springs Interurban Railway. These trailers are coupled to large gasoline-motor cars. The trucks are Brill No. 57-D trailer type

The line extends to Sand Springs and traverses the richest and most populous district in the neighborhood of Tulsa. The cars are of rugged construction and well suited to the hard service of the pioneer period of the railway.

The principal members of the underframing of the passenger cars are 4¾ by 7¾-in. yellow pine side sills, reinforced on the inside with 12 by ⅜-in. steel plates and crossings of white oak, 5¼ by 7¾ in. Inside and under trusses and double-trussed needle beams reinforce the structure. The corner posts are 3¾ in. thick and the side posts 2¾ in. Artificial



Cars for Sand Springs Interurban Railway. Doors at diagonal corners facilitate the handling of rails, lumber, etc. The sliding doors at sides are 5 ft. wide



CARS FOR SAND SPRINGS INTERURBAN RAILWAY. A well designed interior for this class of service

lumber board is used for the headlinings and mahoganized cherry constitutes the interior finish, with doors, window sashes and seats of the same. Ten transverse seats of the Brill "Winner" type are on each side of the car and longitudinal corner seats accommodate two passengers each, furnishing a seating capacity of 56. Push buttons are installed on each window post.

The baggage and express cars have 5-ft. sliding doors on each side and hinged doors at the left hand diagonal corners to facilitate the loading of lumber, rails, etc. Wooden slat seats extend along the sides of the car and are arranged to fold when not in service. Both baggage and passenger cars are equipped with M.C.B. couplers.

The principal dimensions of the passenger cars are as follows:

Length of body	37 ft. 0 in.	Seating capacity	56
Length over platforms	45 ft. 0 in.	Type of trucks	Brill No. 57-D Trailer
Length of platforms	4 ft. 0 in.	Wheel base	4 ft. 6 in.
Width over sheathing	8 ft. 3 in.	Diameter of wheels	33 in.

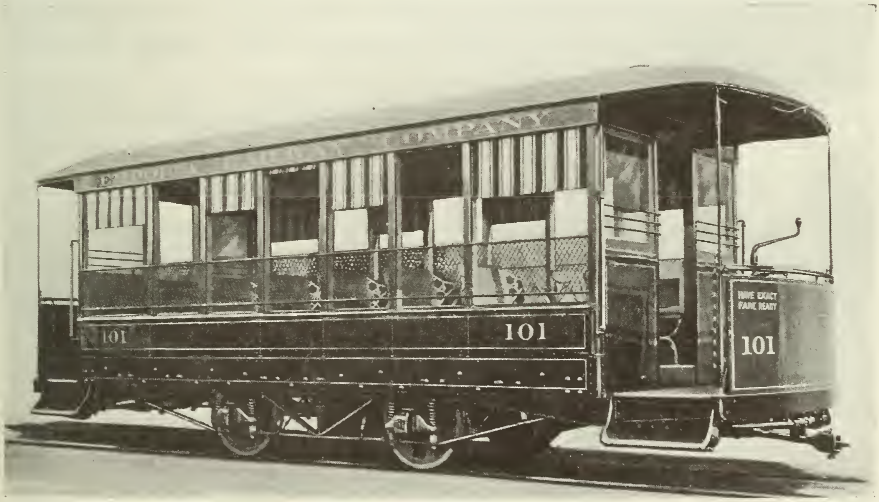
The principal dimensions of the baggage and express cars are as follows:

Length of body	41 ft. 0 in.	Type of trucks	Brill No. 57-D Trailer
Width over sheathing	8 ft. 6 in.		

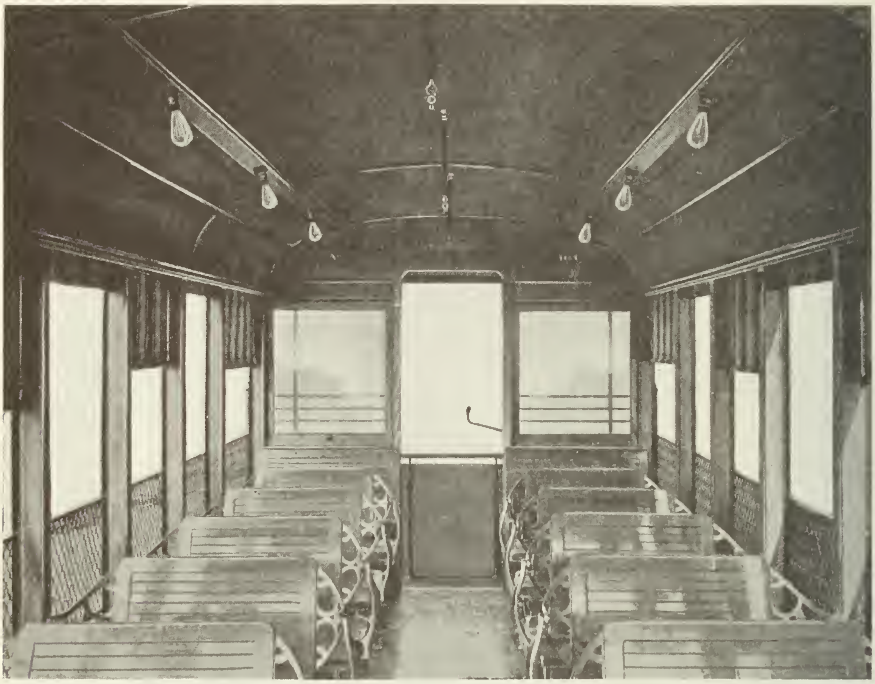
OPEN TRAILER CARS FOR EMPORIA, KAN.

BRILL RUNNING-GEAR

AMONG the single-truck cars lately shipped from the plant of the American Car Company were four open trailers of simple and practical design and well adapted to developing traffic on a new line. The Emporia Railway Company is a new system under the management of experienced railway officials, who have selected this type of trailer for its lightness, durability, suitability to conditions



CARS FOR EMPORIA. The body measures 20 ft. over the corner posts and 27 ft. over the platform. Mounted on Brill running gear with 7-ft. wheel base



CARS FOR EMPORIA. Window guards are 18 in. wide and are made in one piece. Seating capacity 32

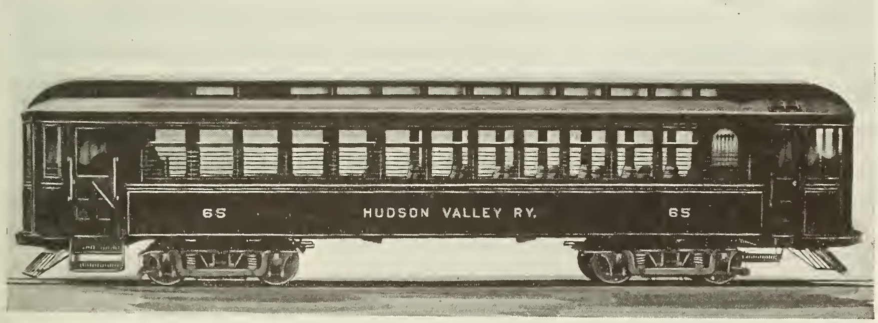
and low cost. The cars can be used in winter for smokers, and, should it ever be found necessary to convert them into a closed type during cold weather, sashes and doors can be readily installed.

The bottom framing includes 3¾ by 7¾-in. side sills with 12 by ⅜-in. plates on the outside, which form the lower side panels. Truck sub-sills are 3¾ by 6½-in. timbers. Corner posts are 3⅝ in. thick and the side posts 2¾ in.; an 18-in. wire screen, made in a single piece, protects the openings on each side of the car; the openings are entirely enclosed in bad weather by heavy duck curtains, which fit down close upon the belt rail. Interiors are finished in ash, with slat seats of the same equipped with reversible backs; corner seats are also transverse and have stationary backs. The windows in the bulkheads drop into pockets and are protected on the outside by three bronze window guards. The cars are mounted on Brill running-gear, which gives them easy riding qualities, and is arranged with truss pipes which in supporting the ends.

Length over corner posts	20 ft. 0 in.	From side sills over trolley boards	8 ft. 6 in.
Length over platforms	27 ft. 0 in.	From track to step	14 7/16 in.
Length of platforms	3 ft. 6 in.	From step to platform	13 in.
Centers of side posts	2 ft. 5¾ in.	From platform to floor	6 15/16 in.
Width over sides	8 ft. 0¾ in.	Seating capacity	32
Extreme width	8 ft. 2 in.	Wheel base	7 ft. 0 in.
From floor to headlining	7 ft. 3⅞ in.	Diameter of wheels	33 in.
From track to side sills	2 ft. 0⅜ in.		

HANDSOME INTERURBAN CARS FOR HUDSON VALLEY RAILWAY

THE Wason Manufacturing Company lately completed an order for three cars of the type illustrated, for the Hudson Valley Railway Company, of Glens Falls, N.Y. This railway system is 128¼ miles in extent and connects Troy, Saratoga and Warrensburg, with Glens Falls at the center of the system. The passenger, express and freight business, which is heavy throughout the year, is greatly increased during the summer months, as the beautiful and healthful region served by the lines has scores of summer hotels and boarding houses, and the crowds of city people



CARS FOR HUDSON VALLEY RAILWAY. Smoking compartment, which is four windows long, is furnished with longitudinal seats. A motorman's cab is provided at each end who frequent this section make it necessary to utilize every car which can be put in commission.

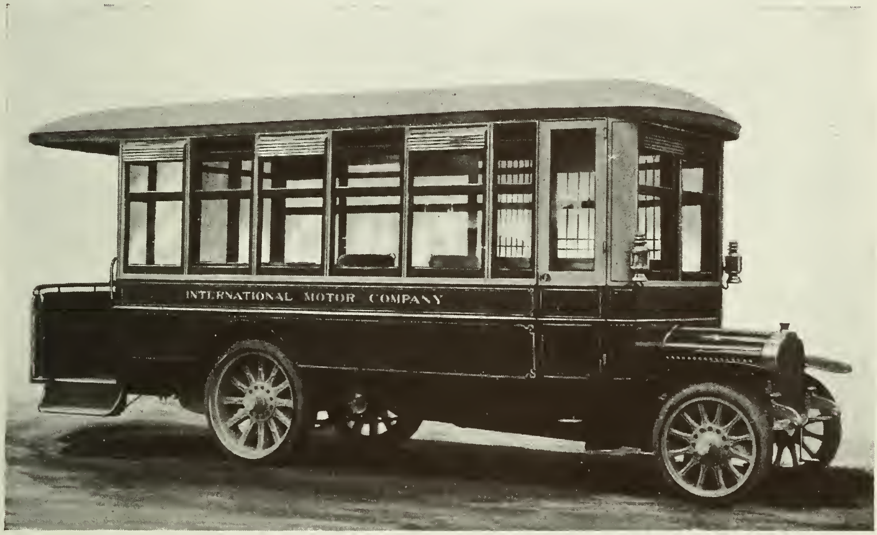
The new cars have 15 high-back, reversible seats and 4 stationary-back corner seats in the general compartment, and woven-cane upholstered longitudinal seats in the smoking compartment. The heater for the hot water system, which is located in a corner of the smoking compartment, is removed during the summer season and replaced by an extension to the seat. A toilet room is located at the corner of the general compartment. The windows have stationary upper sashes and lower sashes arranged to raise; in the vestibules, the end windows drop into pockets and the side windows are stationary. A handsome interior effect is obtained by the use of mahogany for the finish, with inlaid lines of white holly, ceilings tinted nile green and decorated with gold stripes, and bronze green upholstery for the seats. The entrance door in the vestibule at each end is of the single-swing type and folds against the body end. A trap door of stationary type covers the step opening. The opposite side of the vestibule is enclosed with a partition to form a motorman's cab and has a door swinging both ways, giving access to the platform, and a narrow outside door. Single-sliding doors are used in the body ends and partition. Six 5-ft. package racks with coat hooks underneath are provided in the general compartment and two in the smoking compartment.

The cars are built on underframes of structural steel, having side sills of 6-in. Z-bars of 15.6-lb. section; the center sills are 10-in. channels; the center supports consist of 3¾ by 3½-in. angles; the end sills, 6-in. Z-bars; needle beams, 6-in. I-beams; the outside platform supports, 6-in. Z-bars. The bolsters have 8 by 1-in. top members and 8 by 1⅛-in. bottom members.

Length of body	38 ft. 1½ in.	Height from track to upper surface of floor	3 ft. 7 in.
Length over vestibules	50 ft. 1½ in.		
Width over sheathing	8 ft. 6¼ in.	Height from track to top of roof	12 ft. 2⅜ in.
Width over bottom step	8 ft. 9 in.		

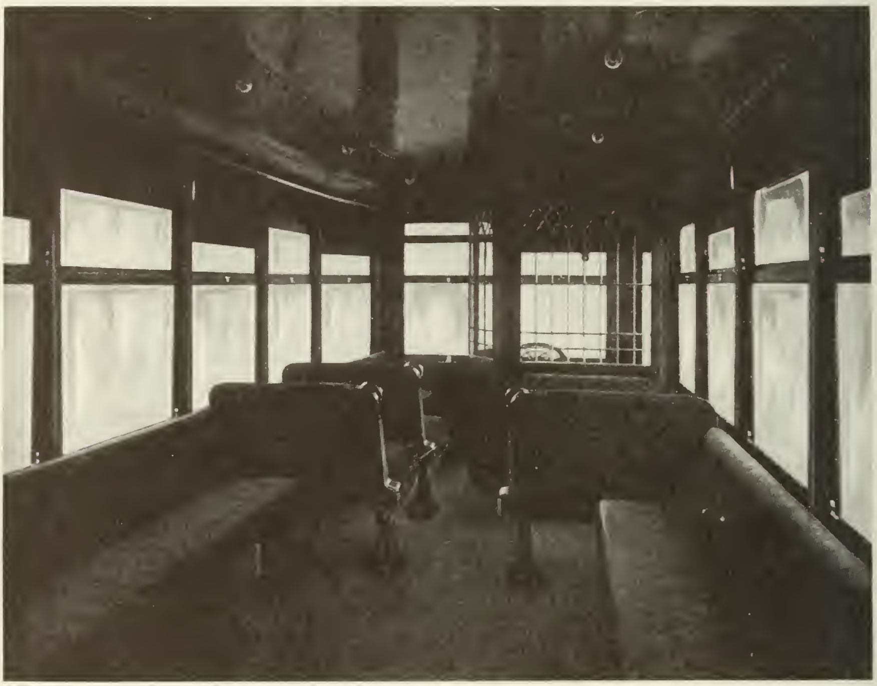
INTERESTING TYPE OF GASOLINE-MOTOR OMNIBUS

THE J. G. BRILL COMPANY has furnished to the International Motor Company (general offices, 30 Church Street, New York) a 29-passenger omnibus mounted on a chassis built by the International Motor Company, which was exhibited at the automobile shows in New York, Philadelphia and Chicago, and attracted much notice and favorable comment. The car was operated during these shows between the exhibition halls and the principal hotels. Both chassis and body have been critically inspected by large numbers of city railway and omnibus line operators, and conceded to be one of the best of its type that has ever been produced.

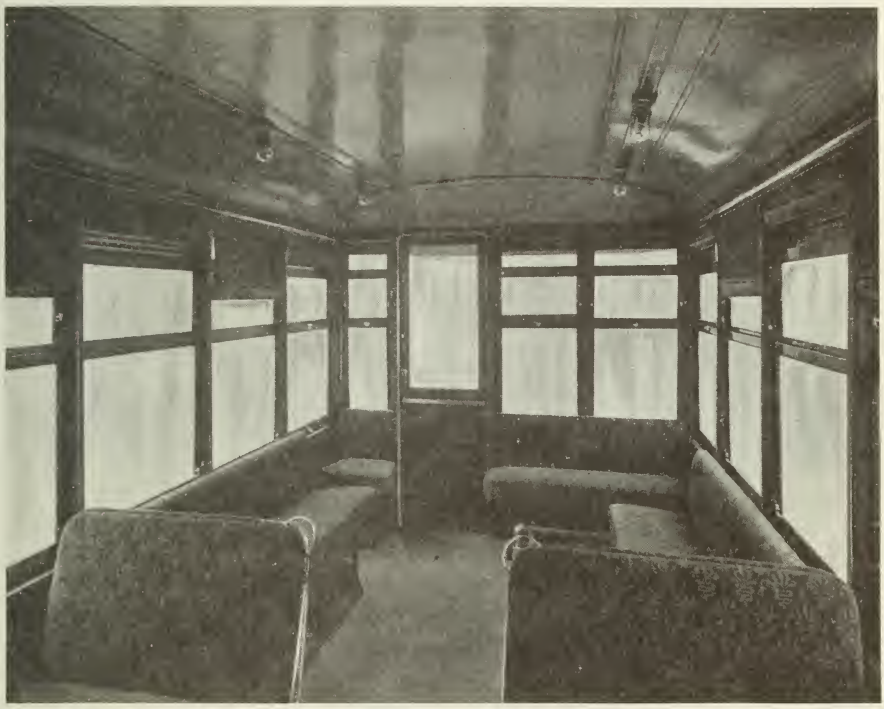


INTERESTING MOTOR OMNIBUS. Twenty-nine-passenger omnibus for feeder service to electric railways. Driver's cab entered from outside

The body is built on the lines of a modern trolley car and, while of light construction, is staunch and suitable to operation over uneven pavements with as many passengers as can be crowded into body and platform. The window sashes are double, the upper sashes raise and the lower drop into pockets, except the two sashes over the rear wheels, which raise. The door at the rear slides into a pocket protected on the outside by a brass screen. Ample room is provided for the driver and he is given a clear outlook in all directions. The compartment is entered on the outside by a door hinged to the corner post. The heating is obtained from the exhaust of the engine brought through a piping system along the sides and rear end and which returns to the muffler. Three bronze ventilators over the windows on each side and one over the driver's window furnish an ample amount of fresh air. The car is well illuminated by electric lights, which receive the current from a battery. Interior finish is mahogany, inlaid with white holly, and the ceiling of selected poplar painted robin's egg



INTERESTING MOTOR OMNIBUS. Stationary upper window sashes; lower sashes drop into pockets, except at the two windows over the rear wheels blue; figured blue plush is used for the seat covering, and the whole appearance is harmonious and exceedingly attractive. The driver's compartment is enclosed in a solid mahogany partition fitted with leaded glass and curved at the side to give plenty of elbow room to the operator. A signal bell is provided which is connected with a cord to a handle on the platform.

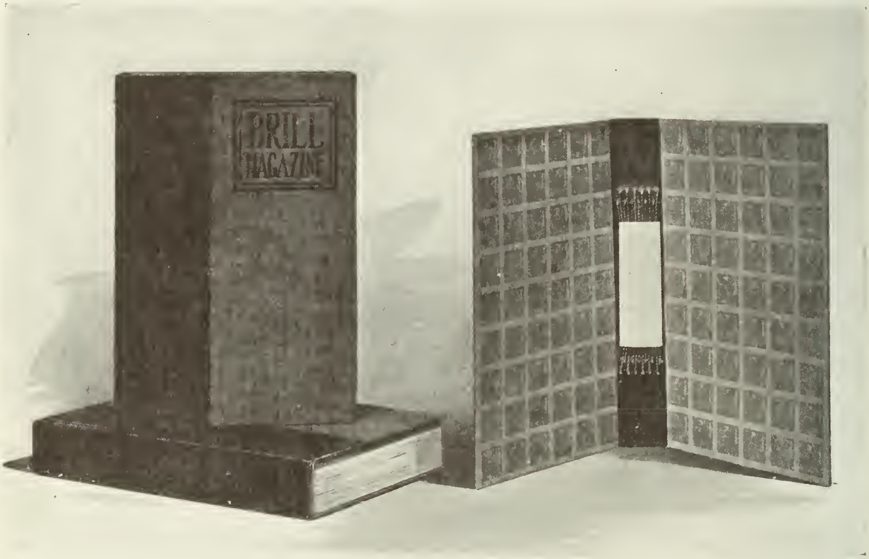


INTERESTING MOTOR OMNIBUS. Exhaust from engine is utilized for heating purposes. Three ventilators are located over the windows at each side

Length over corner posts	15 ft. 6 in.
Length over platforms	19 ft. 8 in.
Length of rear platform	4 ft. 2 in.
Centers of side posts	2 ft. 4¼ in.
Width over sills	7 ft. 1⅝ in.
Width over posts	7 ft. 6 in.
Extreme width	7 ft. 7 in.
From track to side sills	2 ft. 5½ in.
From side sills over roof boards	7 ft. 4½ in.
From floor to headlining	7 ft. 0 in.
From step to platform	10 in.
From platform to floor	10 in.
Seating capacity	29
Wheel base	12 ft. 9½ in.
Diameter of front wheels	36 in.
Diameter of rear wheels	42 in.
Weight of body complete, less chassis	3,460 lb.
Weight of chassis	5,040 lb.
Total weight	8,500 lb.

THE BRILL MAGAZINE BINDER

THOSE who did not use the request-for-binder postal cards sent out with the January issue and wish to preserve their copies in a convenient form, should send for a binder—no cost. The 1912 binder is a vast improvement over the binders of former years and was invented and manufactured within our own organization.



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A CORRECTION

In the biographical sketch of Mr. Albion E. Lang in the March issue of Brill Magazine, it should have been stated that Mr. Lang retired from the presidency of the Toledo Railway & Light Company on December 5th, 1911, and was succeeded by Mr. Frank R. Coates. Mr. Lang remains a director of the company.

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Main Office
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Cable Address: "BRILL," Philadelphia

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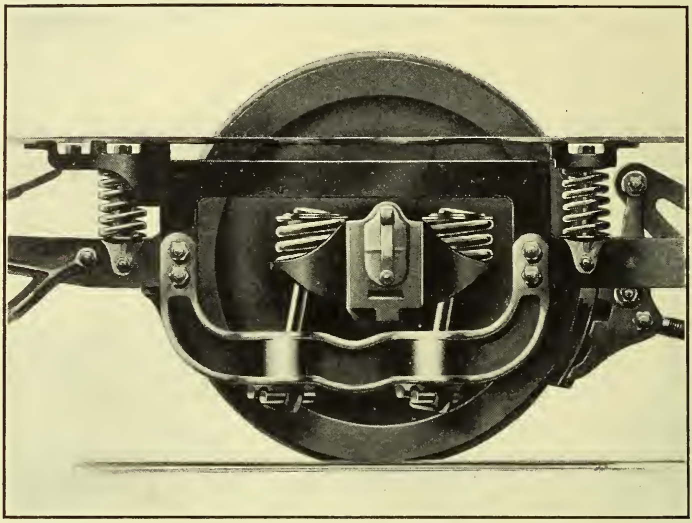

BRILL "RADIAX" TRUCK

It is well worth your while to know the radiating principle of this truck. The links are much longer in the "Radiax" truck than in any other of this class and permit a considerable radial movement of the axles to take place without the links assuming an excessive inclination. The upper end of the links is of hemispherical form and rest in a socket casting at the top of the spring. Note particularly that the lower end of each link has two pins which engage in grooves and realize that at the instant a movement of the link commences one or other of the pins comes out of engagement with its groove, thereby producing an inclination equal to half the distance between the pins, which sets up an immediate and powerful tendency to return to normal position. The arrangement holds the carbody steady on straight track and allows free radiation on curves. The Brill "Radiax" Truck has solid forged side frames.

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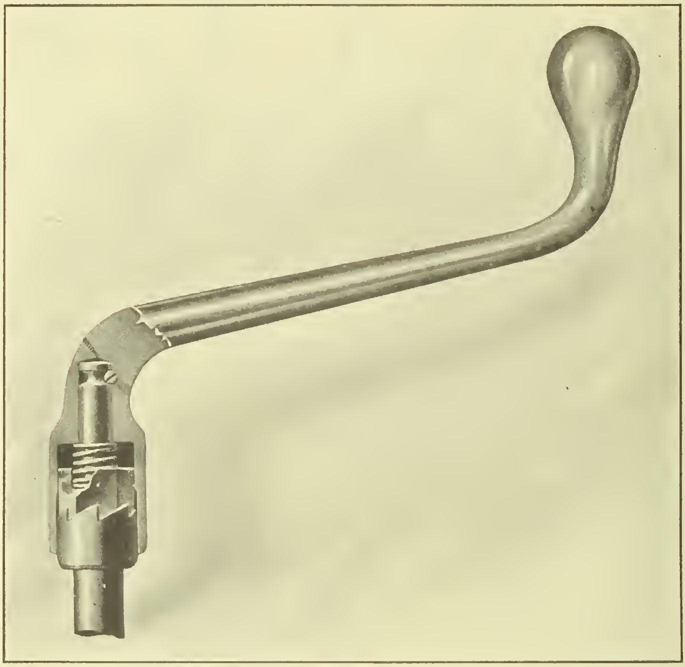

BRILL RATCHET BRAKE HANDLE

PATENTED

No item of car equipment has had such universal use as the brake handle and for the very good reason that it is a necessary part of the equipment of nearly all cars, other than large interurbans, and it was years ago found that but one type out of several on the market was entirely satisfactory in operation and maintenance. The spring and upper ratchet are the only movable parts aside from the handle itself. The handle can be had in either bronze or malleable iron and in several sizes, the standard size being Pattern No. 3401.

THE J. G. BRILL COMPANY

PHILADELPHIA - - - PENNSYLVANIA

W. Kesley Schoepf

President, Cincinnati Traction Company and
Ohio Electric Railway Company

UPPLEMENT TO BRILL MAGAZINE
MAY, 1912

BRILL MAGAZINE

Vol. VI MAY, 1912 No. 5

W. KESLEY SCHOEPF

[WITH PORTRAIT INSERT]

W. KESLEY SCHOEPF, president of the Cincinnati Traction Company and the Ohio Electric Railway Company, was born May 20th, 1864, at Fort Delaware, Del., where his father, General Albin Schoepf, was commandant. He was educated in the schools of the District of Columbia. Early in 1883 he became engaged in the preliminary engineering work of the South Penn Railroad, projected by the Vanderbilts as a parallel line to the Pennsylvania, after which he went to Washington, D. C., and was occupied in engineering work of the Government in that city. In 1890 he became associated with Senators Newlands and Stewart in the street railway lines of Washington as chief engineer of the Rock Creek Railway, now a part of the Capital Traction Company system. He became associated in 1892 with William L. Elkins, P. A. B. Widener and Thomas Dolan in the development of the Washington systems, and remained with them until 1897. He was receiver of the Eckington & Soldiers' Home Railway, the Belt Railway and the Maryland & Washington Railway from 1896 to 1899, and took a prominent part in the reorganization and reconstruction of the City & Suburban Railway of Washington, on which he installed the conduit electric system, being at that time vice-president and chief engineer. In 1900 he became vice-president and general manager of the Consolidated Traction Company of Pittsburgh and Allegheny; became identified with the Cincinnati Traction Company in 1901, first as chairman of the executive committee, and, after leaving Pittsburgh, as president; organized and was elected president of the Ohio Traction Company in 1905, and organized and was elected president of the Ohio Electric Railway Company in 1907; vice-president of the Indiana Union Traction Company; director of the Terre Haute, Indianapolis & Eastern Traction Company and of the Indianapolis Traction & Terminal Company; and chairman of the board of the Cincinnati Car Company.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

CINCINNATI, OHIO*

CINCINNATI, the metropolis of southern Ohio, is situated in the southwest corner of the State on the northern bank of the Ohio River. The city proper has a population of 364,463 (1910 census), of which the most important foreign element is German. The main part of the city extends along the river, its development in a westerly direction being impeded by steep hills which extend around the north and east, rising to a height of about 450 feet and forming an amphitheater surrounding the business section. On the plateaus at the top of these hills are the fine residence sections reached by a series of railways, of which several are operated by gravity systems. The hills in the western part of the city rise from the Millcreek Valley, which for many years contained most of the manufacturing industries; becoming overcrowded, a new section, several miles to the northwest, was found to be well adapted to manufacturing purposes and has been rapidly built up through the co-operation of the city and the Cincinnati Traction Company. Cincinnati is surrounded by numerous contiguous villages, which, while not shown in the population of the city proper by reason of never having been annexed, are nevertheless an integral part of the community. Cincinnati has the distinction, whether enviable or not, of containing within its own city limits two other cities, Norwood and St. Bernard, which are entirely surrounded by the confines of Cincinnati proper. Norwood, with a population of 17,000, is about 5 miles from Fountain Square, while the city extends beyond Norwood 2½ miles. On the south side of the river, opposite the city, are Coving-

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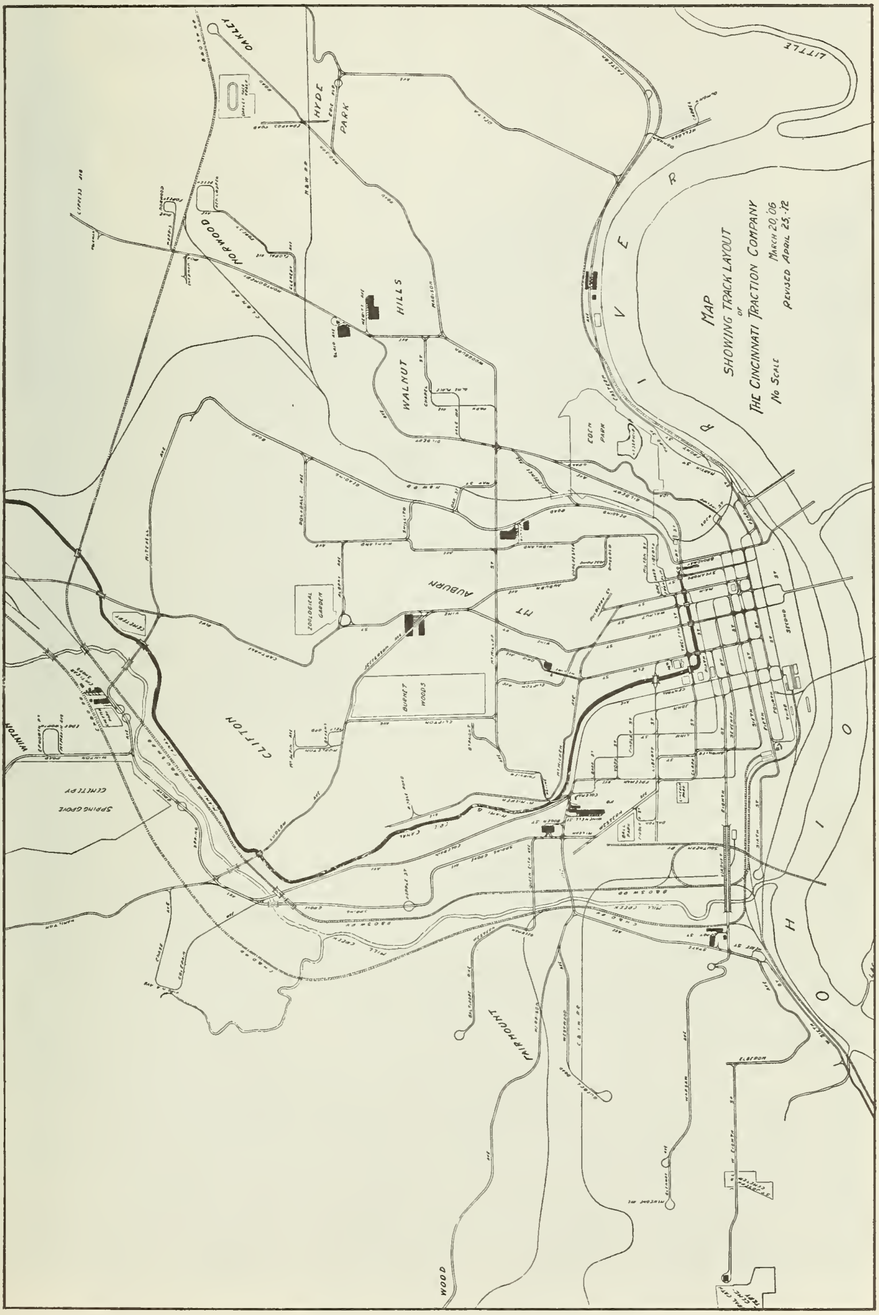
* The forty-first article of this series.



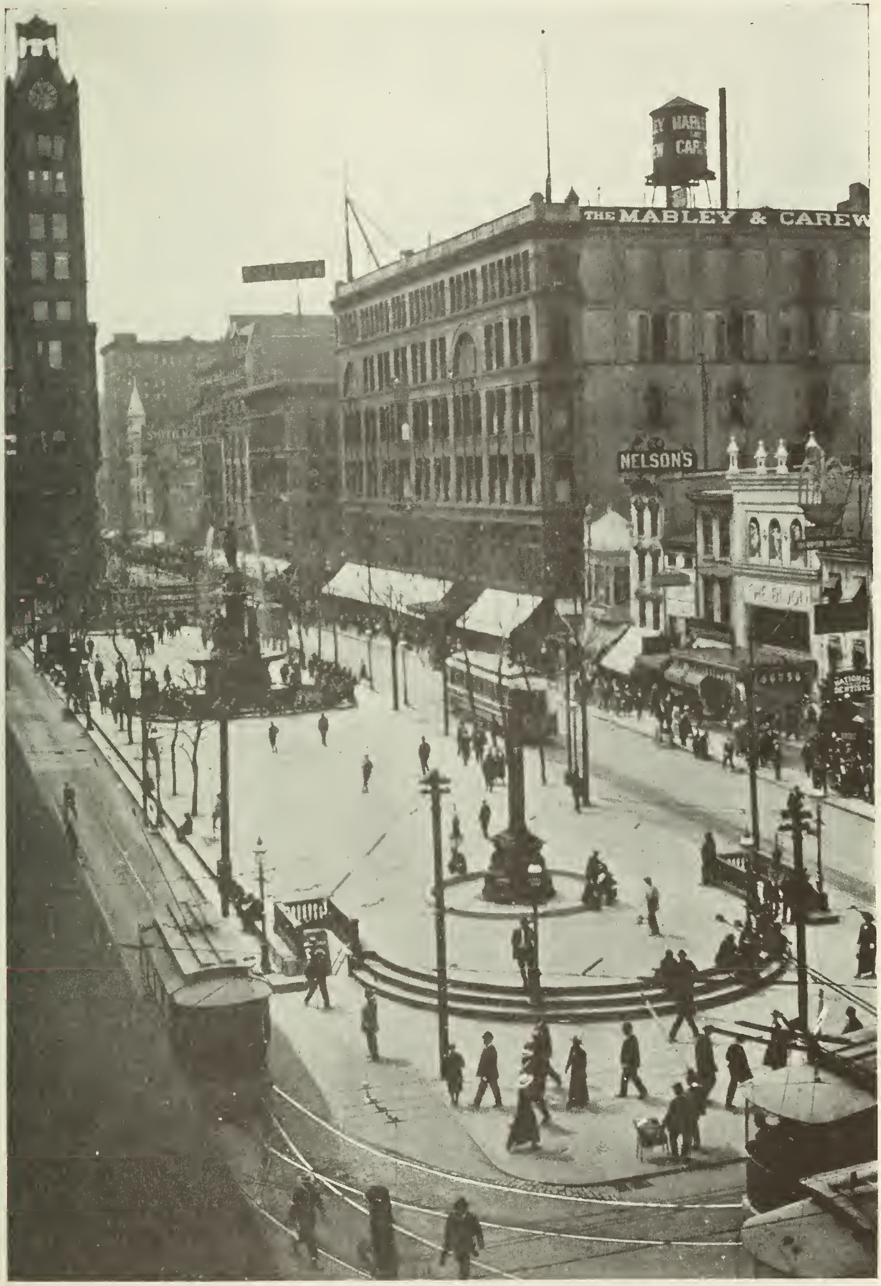
MAP
SHOWING TRACK LAYOUT
OF
THE CINCINNATI TRACTION COMPANY
MARCH 20, '06
REVISED APRIL 25, '12
NO SCALE

ton, Newport, Dayton, Ludlow and other Kentucky suburbs of Cincinnati. The city has a river frontage of 14 miles and is connected with the Kentucky side by 5 bridges.

Cincinnati is a strikingly modern city, with stone and brick business buildings, many high office buildings, great department stores and splendid public buildings and hotels. The Union Central Life and Chamber of Commerce Building, under construction, will be 35 stories high and of magnificent proportions. The city is one of the most important railway centers of the middle west, and the river connection with Pittsburgh and important centers in Kentucky and West Virginia contributes to its commercial greatness. For many years it has been a prominent distributing point for iron, coal and lumber, and is one of the most important meat centers in the country. The manufactures and industries consist mainly of vehicles, harness, leather, hardwood lumber, woodworking machinery and machinery of all kinds, machine tools, printing ink, soap, pig iron, clothing, shoes and distilled liquors. The well-known Rookwood ware, made since 1880 at the Rookwood Pottery, is shipped to all parts of the country.

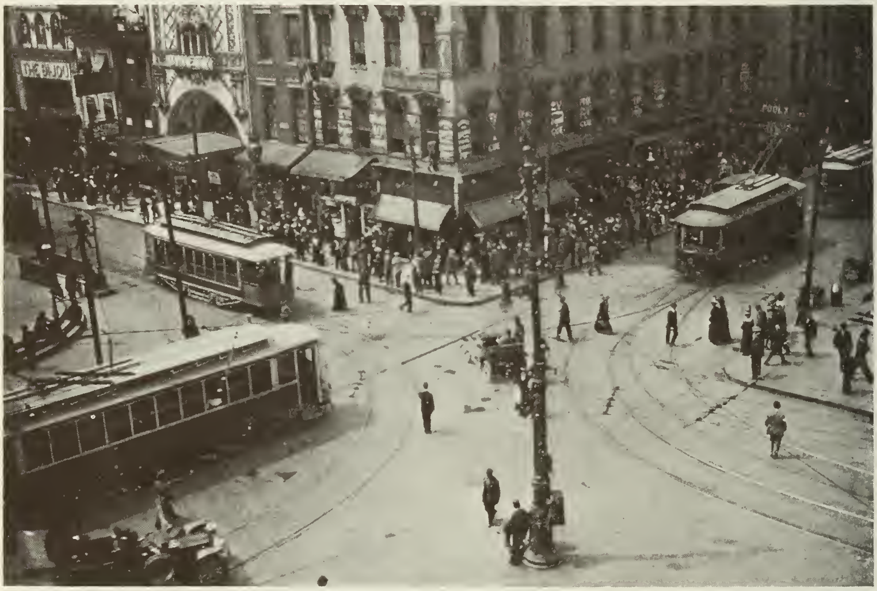
The city has become a prominent educational center, having the University of Cincinnati, which has increased in importance rapidly during the last five years, and its engineering, medical and dental colleges rank with the best in the west; the Roman Catholic College and the Hebrew Union College hold a prominent place in educational circles. There are a number of fine parks and squares, a zoological garden comprising 60 acres and having one of the finest collections in the country, and several amusement parks, among which are Lagoon Park on the Kentucky side, Chester Park, 6 miles from the business center, and Coney Island, 10 miles up the river on the Ohio side.

The Cincinnati Traction Company owns and operates all of the city lines, comprising 222 miles of single track and 125 miles of double tracks. The cars of the Newport and

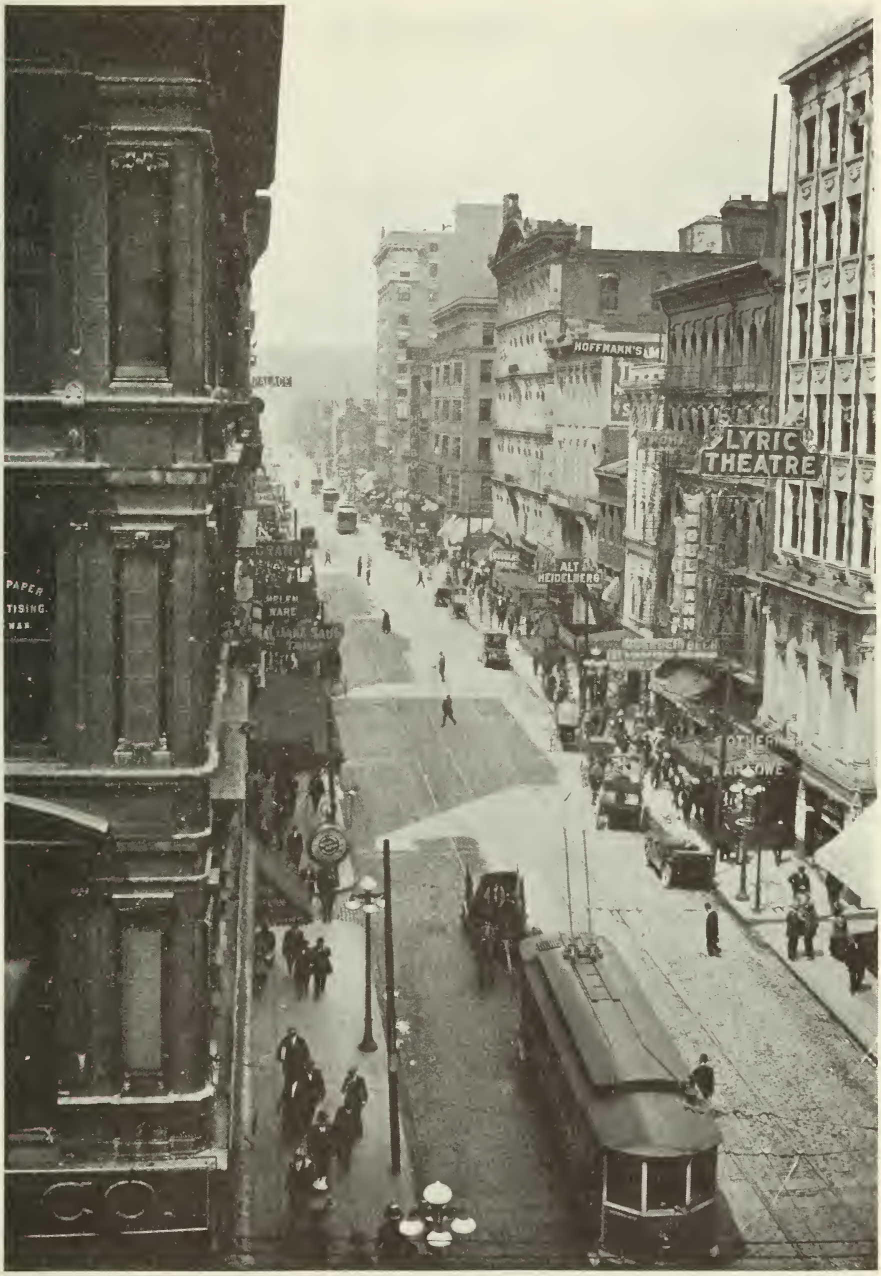


Cincinnati Traffic Conditions and Cars. Fountain Square from the Traction Building. The business district centers here

Covington system cross the river by three bridges and operate over the company's lines to the center of the city. As the map shows, the lines mostly radiate from the business district, looping about Fountain Square and several of the surrounding blocks. At the east end of Fountain Square is the intersection of 5th and Walnut Streets, the heaviest traffic point on the system, said to rank sixth in density of traffic among the street railway crossings of the country. Out of the 36 lines which comprise the entire city railway system, 17 cross or turn at this intersection, and during the period of heaviest traffic an average of 380 cars per hour pass or turn at the crossing. Within a few blocks of Fountain Square are the principal office buildings, department stores, banks, hotels and theaters, and these streets present an animated appearance at all hours of the day and evening, with cars passing at frequent intervals, many automobiles and other vehicles and thronged sidewalks. The rush-hour periods are from



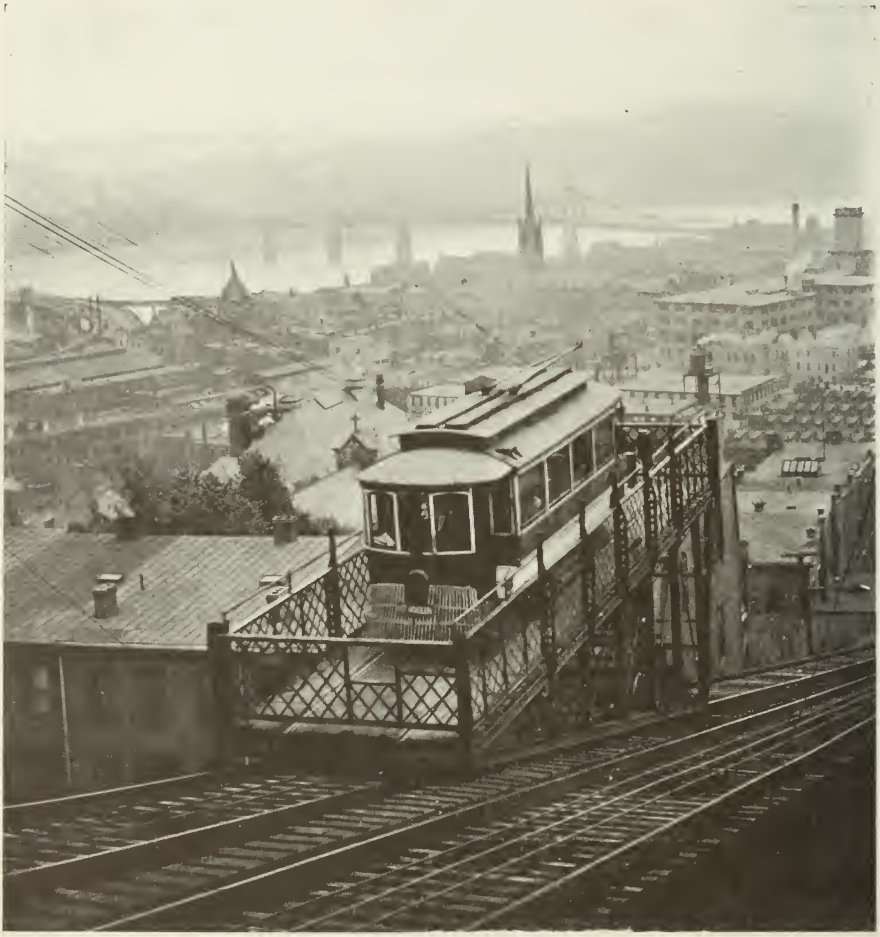
Cincinnati Traffic Conditions and Cars. Fifth and Walnut Streets from the Traction Building. This is the heaviest traffic point on the system and the sixth busiest corner in the country



CINCINNATI TRAFFIC CONDITIONS AND CARS. Vine Street looking north from Fountain Square. A number of the busiest lines of the system operate on this thoroughfare

6.00 to 8.30 in the morning and from 5.00 to 6.30 in the evening.

After leaving the central section of the city, the cars traverse streets which are mostly parallel and regular, till the base of the surrounding hills is reached, where the streets become irregular and the lines converge to proceed out wide avenues and boulevards having grades of from 9 to 12 per cent. The double-truck cars are operated on these avenues, while a large



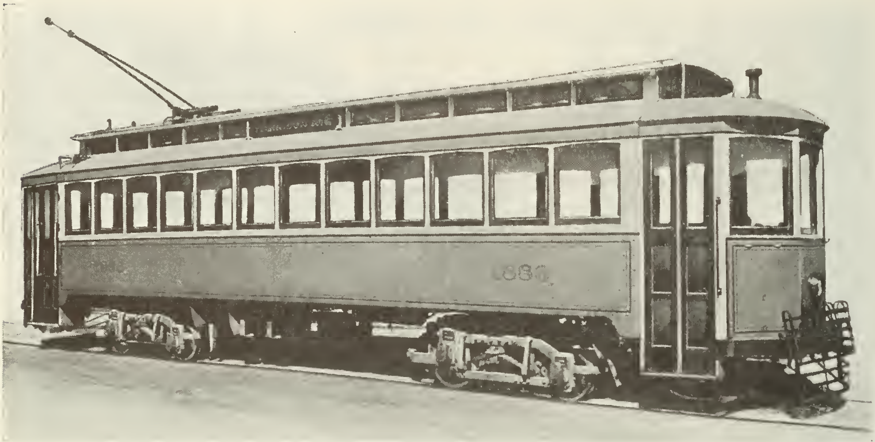
CINCINNATI TRAFFIC CONDITIONS AND CARS. Steep hills surround the business section of the city. At three points on the traction system inclined railways transport single-truck cars between the upper and lower levels

Cincinnati Traffic Conditions and Cars. Peebles Corner in the residence section on the hills in the eastern part of the city is the heaviest transfer point outside of the business district

proportion of the single-truck cars are carried to the tops of the hills by means of inclined railway platforms on trucks, operated by cable, one car being drawn up as the other is let down. There are three of these inclined railways, the lengths and grades of which are, respectively, 673 ft., 34.44 per cent; 945 ft., 29.8 per cent; and 980 ft., 31 8 per cent. Along the top of the northern and eastern hills is a belt line connecting all of the lines which come up from the business section, and, while largely used as a transfer line, is also a trunk line between the Millcreek Valley factory district in the western part of the city and the eastern suburbs.

The hills to the west of the city have developed more slowly as a residence section than those to the east and north, although equally desirable and well served by the trolley system. This is accounted for by the fact that the country beyond has not as many natural advantages tending toward suburban development as the other sections. Few cities have such splendid residence sections as are on these hills within the corporate limits of Cincinnati. The distance from the center of the city is about the same to the tops of all the surrounding hills—from 30 to 45 minutes.

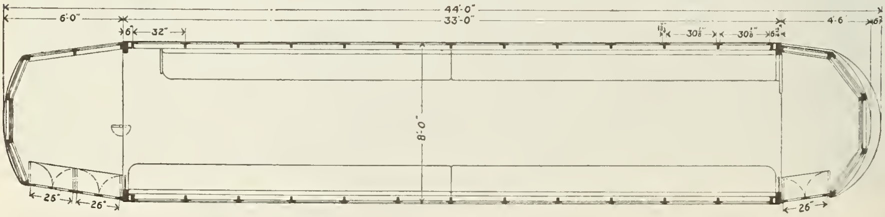
For the year 1911 the Cincinnati Traction Company



CINCINNATI TRAFFIC CONDITIONS AND CARS. Standard car of the Cincinnati Traction Company. Steel bottom frame and side construction. Mounted on trucks of the Brill single-motor type

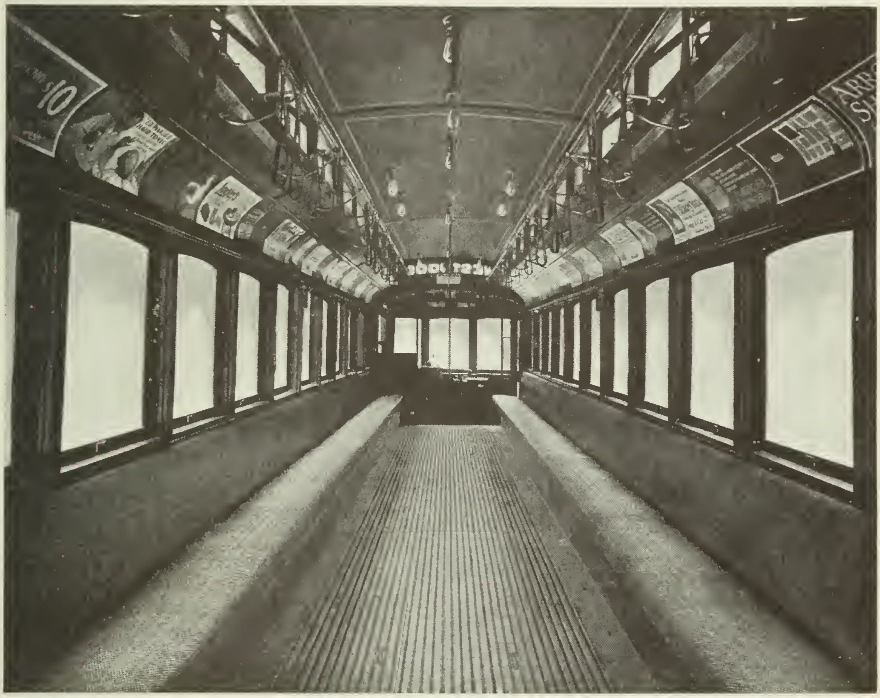
operated 20,000,000 car miles on the city system, transporting 97,726,000 revenue passengers and 35,258,515 transfer passengers. The lines serve a population of approximately 450,000, and, if the Kentucky suburbs are included, about 600,000.

The standard type of car adopted last year was designed by the company and 50 are now in operation. The car has a steel bottom frame with 4 by 3 by ⅜-in. angle sills brought around the ends of the body. The end sills consist of 12 by 3/16-in. plates, reinforced with a 3 by 3-in. angle at the bottom, which forms a bearing for the platform floor and supports. Angle crossings, 3 by 2½ in., have wood fillers to which the flooring is attached. Steel plates, 32 by 5/32 in., riveted to the angle sills and reinforced at the top and bottom, form the sides into powerful plate girders. The body bolsters are formed of



CINCINNATI TRAFFIC CONDITIONS AND CARS. Plan of the above car. Seating capacity, 44 steel channels, and the platforms are supported on two outer members composed of 7 by 3½ by ½-in. angles.

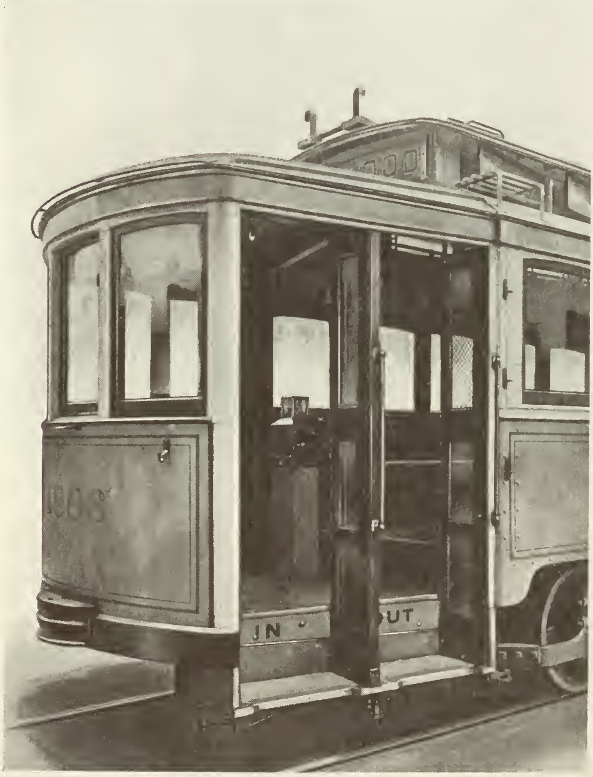
The rear platform is equipped for pay-within system of fare collection and has a dividing railing, with fare box and handles for the independent operation of entrance and exit doors. Each pair of doors is of the single-leaf type and swing inwardly on the step. When closed, there is no projection on which a foothold may be obtained on the outside. At the front end the doors operate on the same principle and are controlled by a handle from the motorman's position. There are twelve windows on each side of the car body, arranged to drop into pockets provided with hinged covers. The interiors are handsomely finished in mahogany, with headlinings of the same. A forced-ventilation hot air heater is located on the front platform.



CINCINNATI TRAFFIC CONDITIONS AND CARS. The windows are arranged to drop into pockets provided with hinged covers. Forced ventilation heater on front platform

The general dimensions are shown on the diagram on page 138. The height from bottom of sill to top of roof, 8 ft. 5½ in.; height from track to under side of sill, 36½ in.; truck centers, 21 ft. The weight of the car, less electrical and air brake apparatus, is 14,486 lb.; weight of electrical and air brake apparatus, 3,114 lb.; weight of pair of trucks with gears, 10,160 lb.; total weight, 34,800 lb.

Aside from the cars just described, 200 other double-truck cars and 900 single-truck cars, about equally divided between open and closed, form the passenger equipment. About 300 cars are required for normal operation, and an average of 625 cars are placed on the lines during the evening heavy traffic period. The service car equipment consists of 24 snow sweepers, 5 sprinklers, 11 sand cars, 1 sand car for distribution of sand by compressed air, 2 supply cars, 1 electric driving shovel of ⅝ cu. yd. capacity, 1 locomotive crane car of 15 tons capacity, 2 electric crane cars, 1 coal car, 4 wreckers, 8 hand cranes, 3 mounted concrete mixers, 30 side dump, 3 mail cars and 40 work cars of various other types.

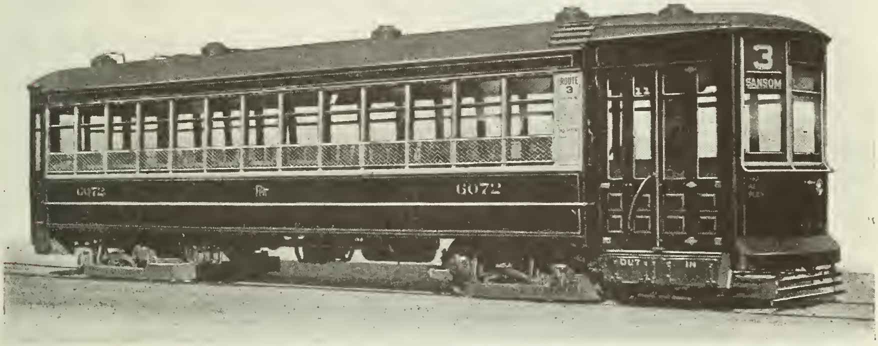


CINCINNATI TRAFFIC CONDITIONS AND CARS. Pay-within platform with fare box and handles for independent operation of entrance and exit doors

THE "NEARSIDE" CAR FOR THE PHILADELPHIA RAPID TRANSIT COMPANY

BRILL SEMI-CONVERTIBLE WINDOW SYSTEM

COMMENCING with the 1st of April, The J. G. Brill Company is delivering 100 cars a month on an order of 500 cars of the "Nearside" type to the Philadelphia Rapid Transit Company. A general description of the "Nearside" car and its operating features was published in BRILL MAGAZINE of June, 1911. The present article is intended to supplement the article referred to with a description of some of the principal structural details and illustrations which show a change in the seating plan and a few minor developments that have resulted through experience in the practical operation of the car under all conditions.



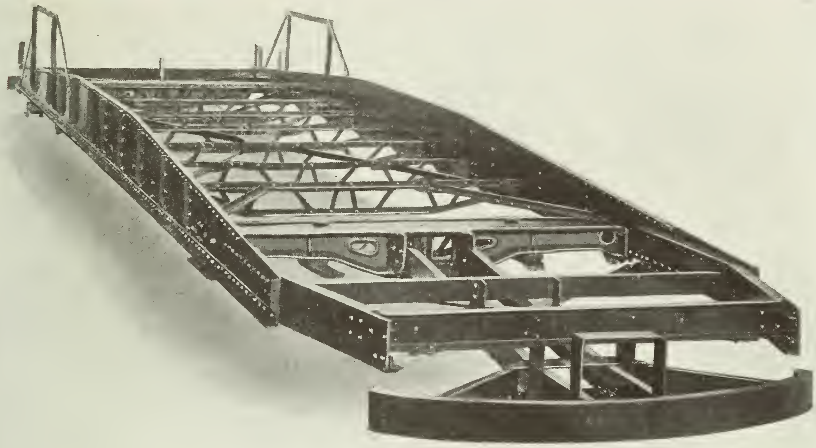
PHILADELPHIA "NEARSIDE" CAR. Brill semi-convertible window system with sashes hinged together. Brill No 39-E single motor truck

Attention is directed to the supplement with this issue, which shows a plan view, side elevatíon and cross section of the "Nearside" car with principal dimensions.

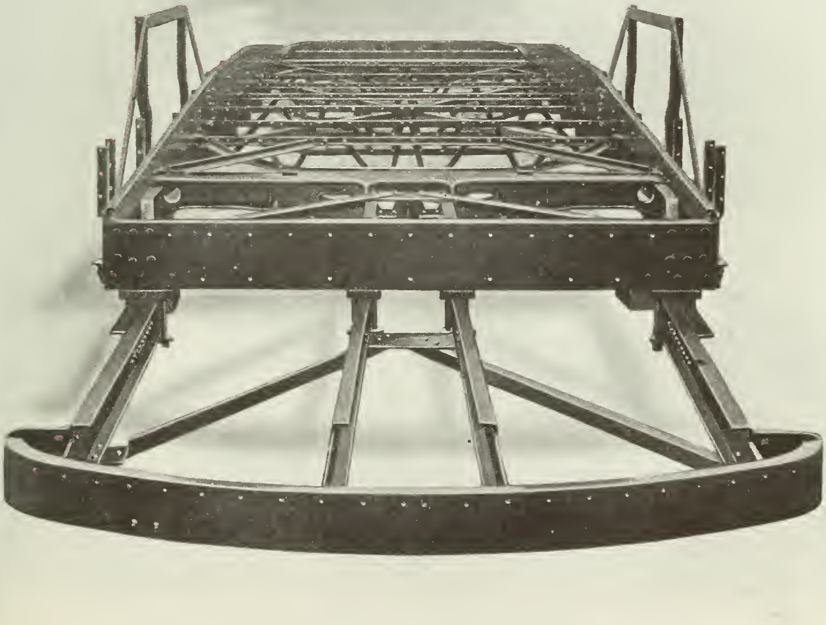
The bottom frame, shown on page 143, is made entirely of steel. The side sills consist of 5/16-in. plate, 18 in. at the widest part, reinforced at top and bottom and vertically at intervals by light angles. At the front end an upper truss rod assists to prevent deflection of the overhang of the main frame. Between the bolsters are 8 crossings built up of angles with diagonal cross members, forming light but powerful trusses. The body bolsters are of cast steel with the ends lipped down under the side sills and are designed to carry 10,500 lb. at each end when supported at the center. The side posts are tenoned into a yellow pine sill, which is bolted to the lower angle of the sill plate; strap bolts extend through pine sill and angle, and the posts are additionally bolted through the vertical angles riveted to the sill plate. Cold rolled sheet steel in four sections covers the wooden concave and convex side panels, and at the bottom is a 2 by 3/16-in. steel molding beveled on the top edge. Compound carlines, with the steel member 1½ by ⅜ in., at each post, and wooden carlines between, support the plain arch roof. The interior finish is of cherry, with window sashes and doors of the same; headlinings of 3-ply maple veneer.

The Brill semi-convertible windows have sashes hinged together in the improved method now installed in a majority of the cars having Brill Plain Arch roof. Besides the usual brass sash stiles of this type of window, the sash rails which come together are also of brass and fitted to form a hinged waterproof joint. The seats are of Brill manufacture, and, in order to obtain the maximum length of seat cushion in the transverse type, the pressed steel parts which support the back are designed to pass under the cushion instead of around the ends. The doors of the front platform are operated independently or in unison by the motorman and the emergency door at the rear is operated from the conductor's position.

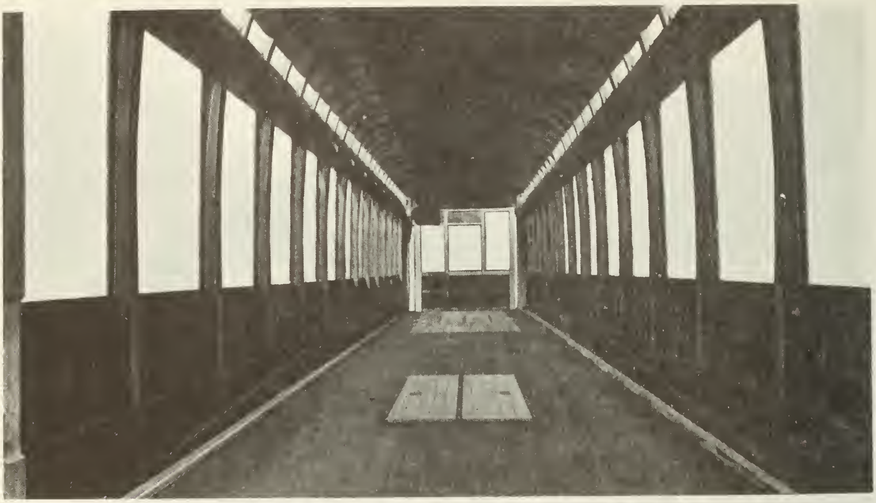
The "Nearside" cars are mounted on Brill single-motor trucks No. 39-E, equipped with 2 West. 306 motors of 50 hp. each; carbody weighs 19,400 lb.; air-brake equipment, 1200 lb.; body electrical equipment, 1200 lb.; motors, 4800 lb.; pair of trucks, 9920 lb.; total weight, 36,520 lb.



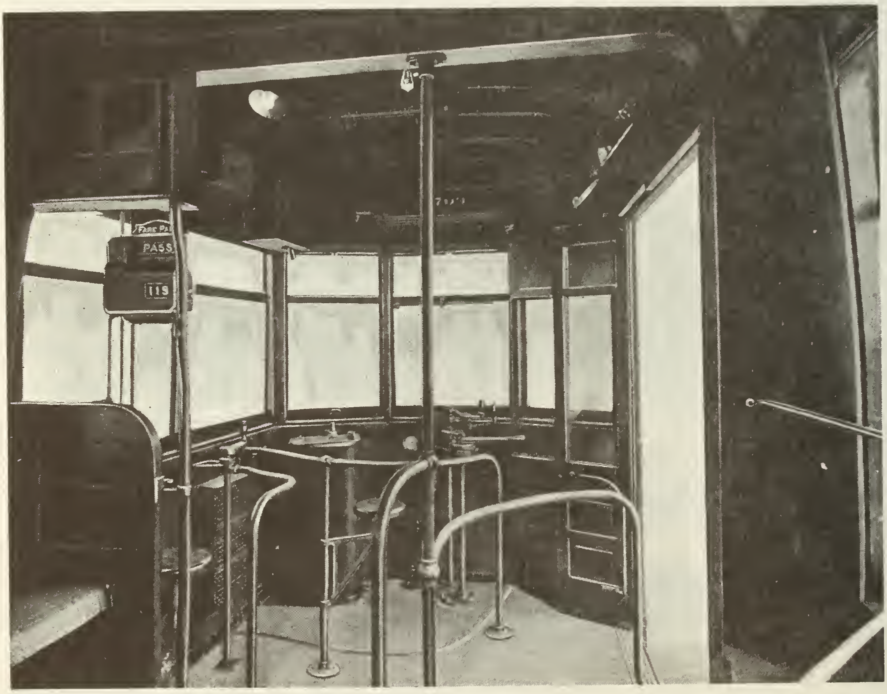
Philadelphia "Nearside" Car. Steel underframe from rear end



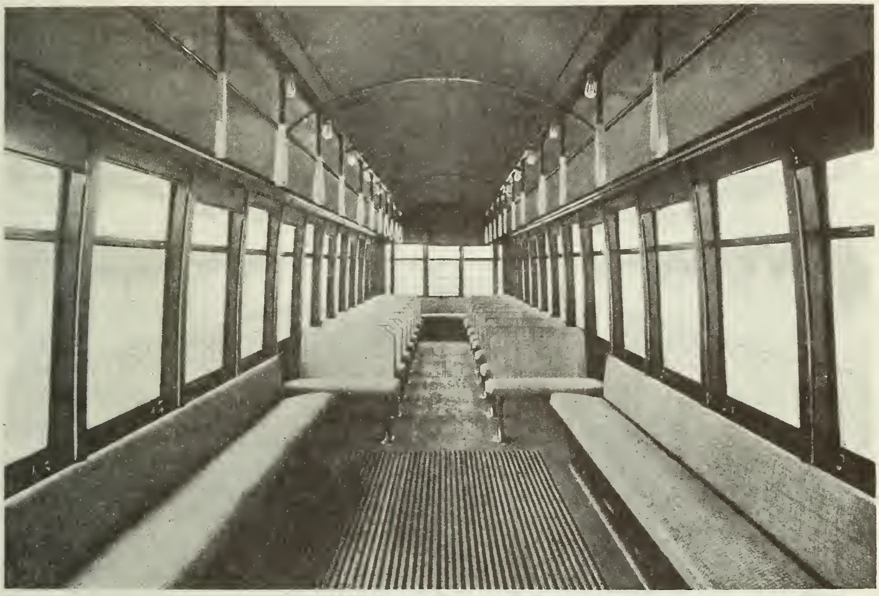
Philadelphia "Nearside" Car. Underframe showing platform framing. Weight, 5,280 lb.



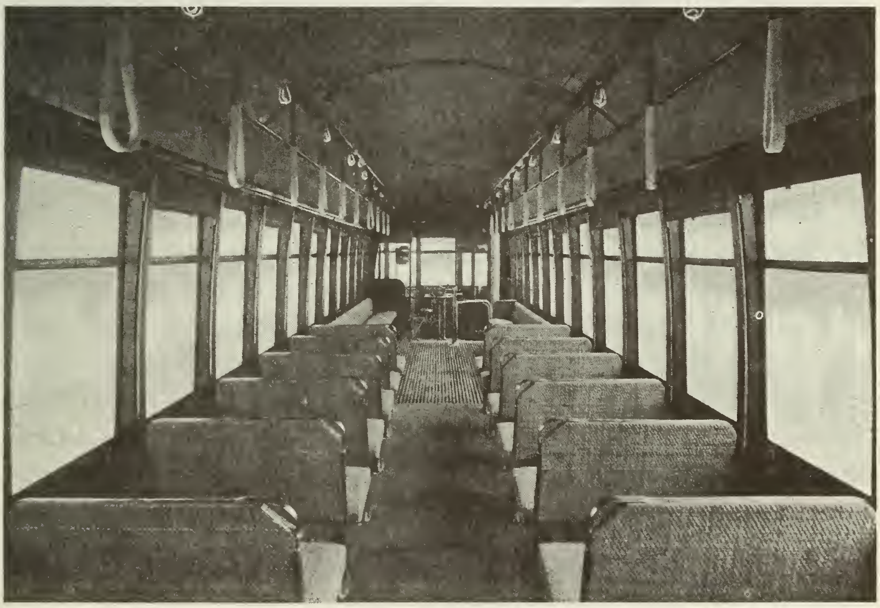
PHILADELPHIA "NEARSIDE" CAR. Side posts tenoned into yellow pine sill, strap-bolted through angle sill and bolted to vertical angles riveted to sill plate



PHILADELPHIA "NEARSIDE" CAR. Entrance and exit doors simultaneously or independently operated by motorman. Emergency door at rear operated by conductor



PHILADELPHIA "NEARSIDE" CAR. Transverse seats accommodate 32; longitudinal seat at right, 10; longitudinal seat at left, 7; circular seat at rear, 5; total, 54

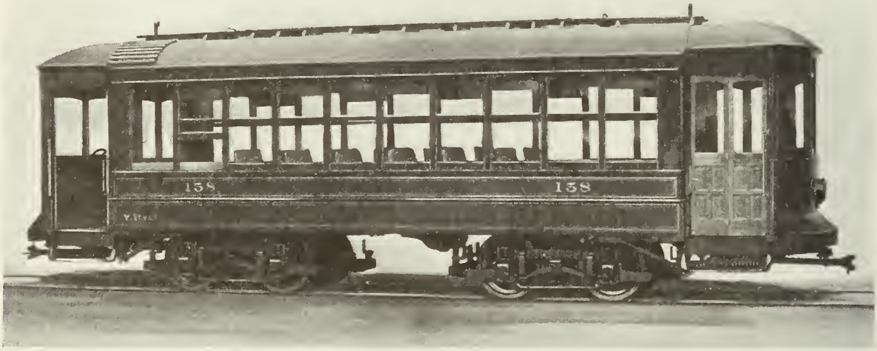


PHILADELPHIA "NEARSIDE" CAR. Interior finish, cherry; ceilings, maple. Floor slopes downward 1½ inches from bolster to platform

MORE SEMI-CONVERTIBLE CARS FOR YORK, PA.

No. 27-GE1 TRUCKS

THE York Railways Company has just received four additional cars of the type illustrated, built by The J. G. Brill Company. These cars are practically the same as a lot furnished a few months ago and shown in BRILL MAGAZINE of February last.* Like the cars of the former order, these are built on steel underframes, having side sills of 18 by 3/16-in. plates, reinforced at the top with a 3 by 5/8-in. plate and at the bottom with a 2½ by 2½ by 3/8-in. angle; the end sills are formed of 10-in. channels and the diagonal braces of 3 by 1/4-in. plates; the two center stringers are made of 4-in channels. The frame has three crossings made in the form of an open truss, with the top chord of 4-in. channel and the bottom chord of 4 by 3/8-in. plate, dropped at the center to pass underneath the center stringers. This forms a powerful understructure, capable of resisting deflection of any member, and is light as well as strong, the weight, including the platform knees and bumpers, being 4,320 lbs.



CARS FOR YORK. Standard car of the York Railways Company mounted on Brill No. 27-GE1 trucks

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*The article on the York Railway Company's cars in the February, 1912, issue of BRILL MAGAZINE contained several errors, particularly in regard to weights.

The upper structure is framed with straight-grained ash corner posts, 3 by ⅝ in. thick, and side posts 2¼ in. thick; sweep of posts, 1¾ in. The weight of the cars is reduced by using Brill Plain Arch roof, which is supported on compound rafters; the platform hoods are detachable. Six Globe ventilators are placed along the center of the roof. This form of roof permits the window openings to be 4½ in. higher than obtainable with the clerestory type. White ash is used for the interior finish and 3-ply poplar veneer, painted light green, for the headlining. Six Brill "Winner" seats on each side of the aisle and longitudinal corner seats, occupying the space of two windows each, furnish a seating capacity of 40. Folding doors of the Brill automatic type, hinged against the vestibule corner posts, are provided, instead of folding gates as in the former order of cars.

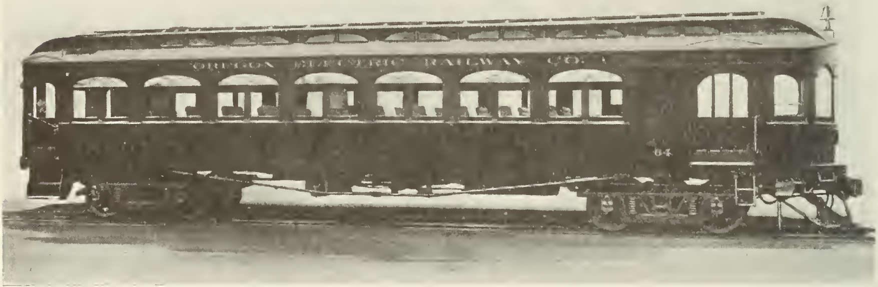
Length over corner posts	26 ft. 0 in.
Length over platforms	36 ft. 0 in.
Length of platforms	5 ft. 0 in.
Centers of side posts	2 ft. 5 in.
Width over sills including sheathing	8 ft. 6¾ in.
Width over posts	8 ft. 9½ in.
Extreme width	9 ft. 1¾ in.
From track to side sills	2 ft. 8⅜ in.
From rail over trolley boards	11 ft. 9⅛ in.
Track to step	16¾ in.
Step to platform	15 in.
Platform to floor	8¼ in.

Seating capacity	40
Type of trucks	Brill No. 27-GE1
Wheel base	4 ft. 6 in.
Diameter of wheels	34 in.
Size of journals	3⅞ in.
Type of motors	GE-54—4-25 hp.
Wt. of body less elec. equip.	14,000 lb.
Wt. of electrical equipment	933 lb.
Wt. of air brake equipment	817 lb.
Weight of trucks	10,400 lb.
Weight of motors	7,600 lb.
Total weight	33,750 lb.

INTERURBAN CARS FOR THE OREGON ELECTRIC RAILWAY

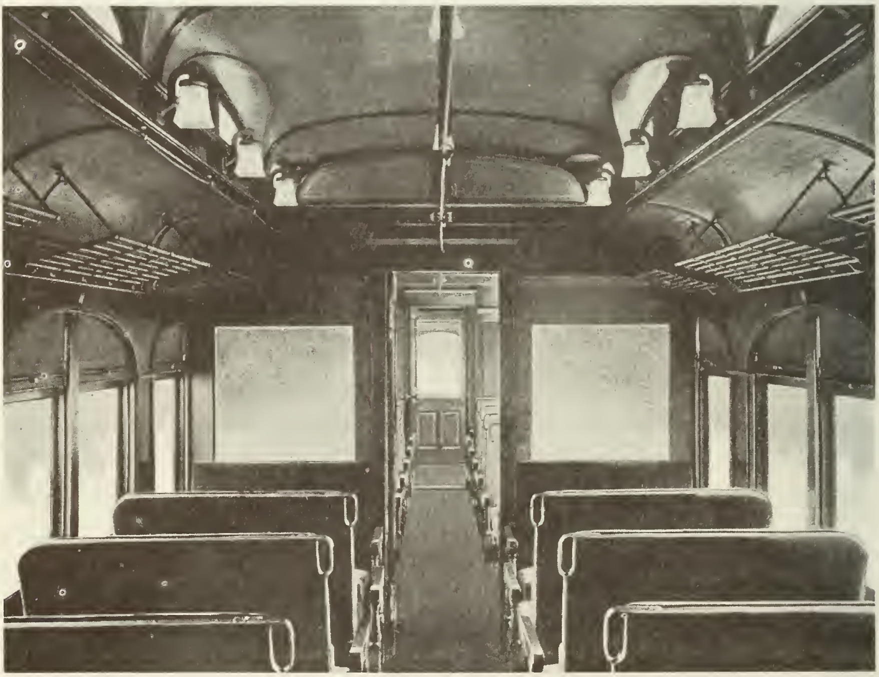
MOTOR AND TRAILER TYPES

A TRAIN of six motor cars, three of which are combination passenger and baggage and three combination passenger, smoking and baggage, arrived in Portland about May 1st, and a train of ten straight passenger cars ar-

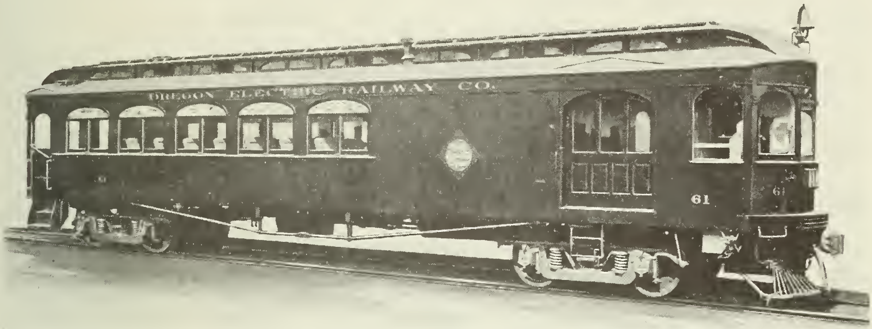


Cars for Oregon Electric Railway. Combination passenger, smoking and baggage car. The ten straight passenger trailer cars are of the same general appearance

rived about the 15th, and were delivered to the Oregon Electric Railway Company. These cars were built by the American Car Company and are fine examples of interurban

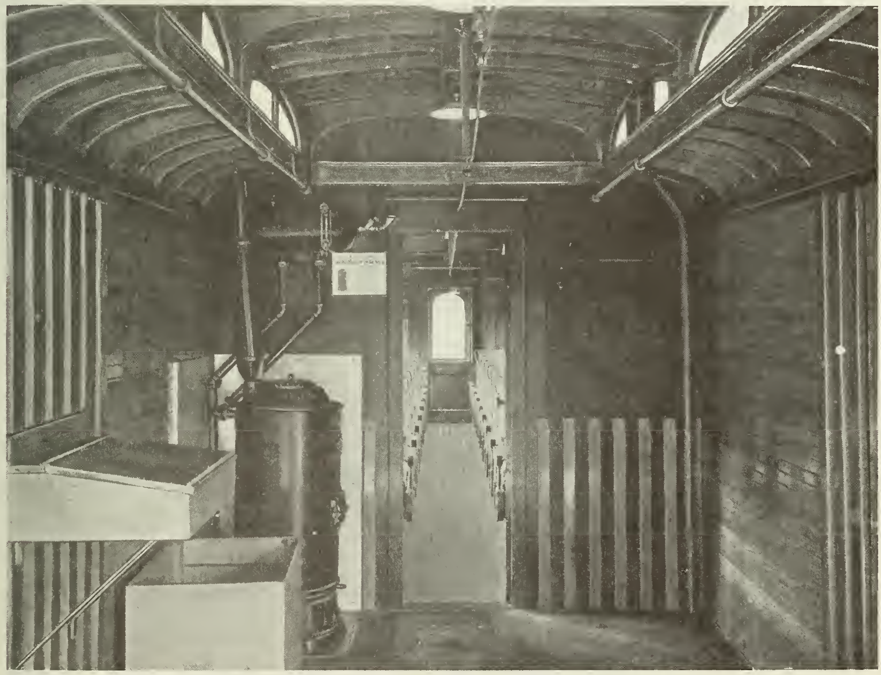


Cars for Oregon Electric Railway. Interior of general compartment of above car. Seating capacity of compartment, 26, and of smoking compartment, 28

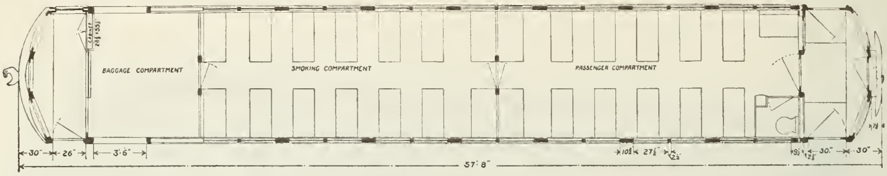


Cars for Oregon Electric Railway. Combination passenger and express type The cars were built by the American Car Company and are fine examples of modern interurban equipment

car design and construction. The straight passenger cars are not illustrated, as they are of the same general appearance as the other cars. The Oregon Electric Railway Company



Cars for Oregon Electric Railway. Interior of express compartment of above car. Seating capacity of passenger compartment, 38



CARS FOR OREGON ELECTRIC RAILWAY. Plan of car shown on page 148. The three types of cars on this order are of the same length and general dimensions

operates a 50-mile line between Portland and Salem, running in a southerly direction through the Willamette Valley, and a line through Hillsboro to Forest Grove, 22 miles west of Portland. These are the main lines of the system, which has a trackage of 145 miles. The tracks are laid on a substantially-built roadbed, and the operation is by d. c. catenary-supported trolley. Trains are operated on frequent headway and at high speed and, from the opening of the system in 1908, the lines have done a remarkably large business, both in passenger and freight transportation.

CARS FOR OREGON ELECTRIC RAILWAY. The six motor cars are equipped for single-end control and for operation singly, in trains, or with trailers

The new combination cars are for motor service, either alone or in trains with other motor or trailer cars, and are intended for use at front end of train and equipped with single-end control. The straight passenger cars, although built for trailer service, are arranged to be readily equipped for motor operation. The underframing of all the cars is the same and is composed of long-leaf yellow pine side sills, 4½ by 8 in., reinforced on the inside for the full length with 8-in. 21.25-lb. channels gained into the sills; the center and intermediate sills consist of 6-in. 17.25-lb. I-beams, with 3 by 6-in. long-leaf yellow pine fillers on each side and extending to the bumper at each end; 4½ by 8-in. oak end sills are tenoned into the side sills, center and intermediate sills, and are reinforced on the inside with 6 by ½-in. steel plates turned to form angles against the longitudinal sills; the cross ties consist of two 8-in. 20.5-lb. I-beams fitted into queen posts and secured to the longitudinal sills. The bolsters are of steel plate truss form, composed of 12 by 1¼-in. members. The flooring is of two courses ⅞ by 3¼-in. tongued-and-grooved yellow pine, the upper laid longitudinally and the lower transversely, with waterproof building felt between. Three deadening floors, each 13/16 in. thick, two between and one underneath the sills, have two layers of ½-in. hair felt between the lower main floor and the top deadening floor. The cars are plainly but richly finished in selected Mexican mahogany, with window sashes and doors of the same.

The general dimensions of all of the cars are the same and are as follows:

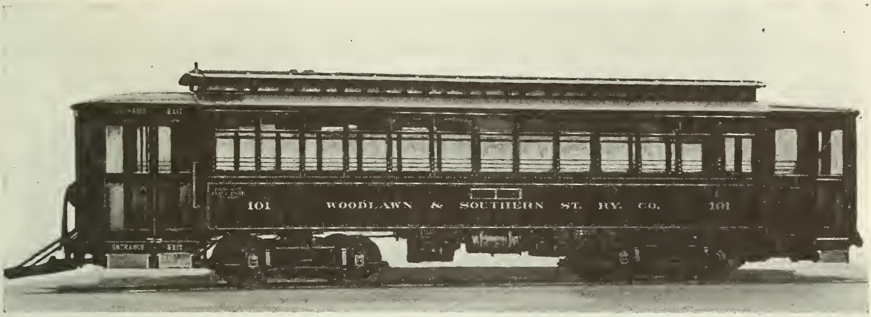
Length over platforms	56 ft. 4 in.
Length of rear platform	4 ft. 6¾ in.
Length of short baggage compartment	7 ft. 10¾ in.
Length of long baggage compartment	17 ft. 10¾ in.
Length of smoking compartment	19 ft. 7⅛ in.
Centers of side posts	2 ft. 3½ in.
Width over sides	9 ft. 1½ in.
Extreme width	9 ft. 4 in.
From track to sills	3 ft. 7 in.
From sills over trolley boards	9 ft. 10½ in.
From floor to center of headlining	8 ft. 5¾ in.
From track to first step	17 11/16 in.
Risers	11 in.
Seating capacity, passenger and baggage car	38
Seating capacity, passenger, smoking and baggage car	54
Seating capacity, straight passenger car	62
Bolster centers	36 ft. 3 in.
Truck wheel base	6 ft. 6 in.
Diameter of wheels	37¼ in.
Motors	GE-73

SINGLE- AND DOUBLE-TRUCK CARS FOR THE WOODLAWN & SOUTHERN STREET RAILWAY

STEEL UNDERFRAMES

THE Woodlawn & Southern Street Railway Company is a new line connecting Woodlawn and Aliquippa on the Ohio River, twenty miles northwest of Pittsburgh. The line, which is 4 miles long, was opened on January 1st with six cars, four being of the large type illustrated—two for motor and two for trailer operation, mounted on high-speed trucks; two of the smaller type, mounted on Brill No. 21-E trucks.

The larger cars are built on underframes which are constructed of steel, with the exception of yellow pine side sills bolted to top of angle sills. The sides are composed of structural steel made up of 34 by 5/32-in. plates in three sections, riveted together with a face plate 3 by 5/32 in., and having reinforcing angles on the inside of the plate. The bottom edge is reinforced with a 6 by 4 by 3/8-in. angle and 12 by 1/4-in. sill plate. This sill plate is stiffened by a 1 1/2 by 1 1/2 by 1/4-in. angle, riveted to the top edge, which serves also to support the back of the longitudinal seat, and at the bottom edge of the sill plate is a 6 by 4 by 1/2-in. angle sill. The yellow pine sills are bolted to the top of this angle iron sill and mortised for side posts. There is one center sill, which consists of an 8-in. 15.75-lb. steel channel which extends from end sill to end sill and securely riveted thereto and to the intermediate steel channel crossings. Each end sill consists of 9-in. 15-lb. channel. The main crossings are made up of two 4-in. 5.25-lb. channels in truss form, and the intermediate crossings are also 4-in. channels. The main crossings and intermediate crossings are riveted to the side sills with 3/16-in. gusset plates.

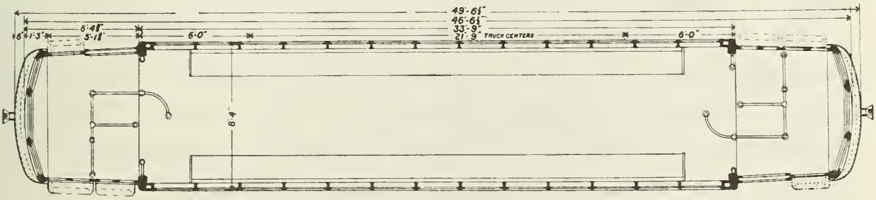


Cars for Woodlawn & Southern Railway. Two of these cars are equipped with motors and two are for trailer operation

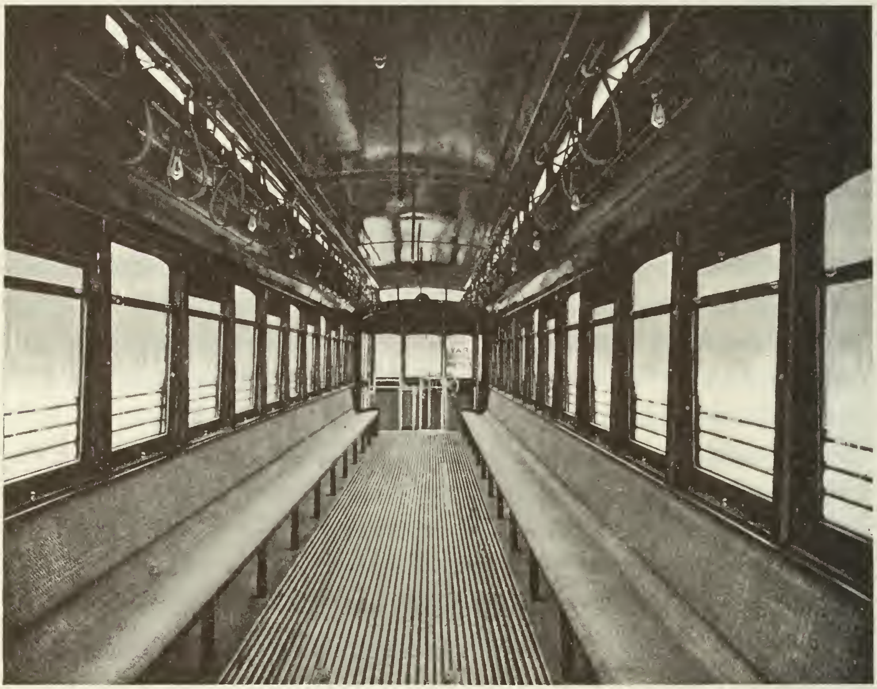
The platforms are supported by outside knees of open channel construction with draft knees of oak, reinforced on each side with 4 by ¾-in. steel plates which are bolted to the side sills and extend back to the bolsters and attached to the intermediate crossings and the center sill. Inside truss rods of 2½ by ⅜-in. steel are carried on the post just under the window sill. The bolsters are of the built-up truss type, with 9 by 1-in. top and bottom members.

The cars have 13 double-sash windows on each side, the upper sash being stationary and the lower arranged to drop into pocket and enclosed with a hinged cover. The longitudinal seats are made of sheet steel covered with felt and rattan. Cherry is used for the interior finish and for the doors and sashes, and the ceilings are made of artificial lumber, ¼ in. thick, and painted Nile green.

The single-truck cars have also steel bottom frames composed of 12 by ⅜-in. sill plates, reinforced at the bottom edge with 3 by 2 by ⅜-in. angles. There is an additional wooden

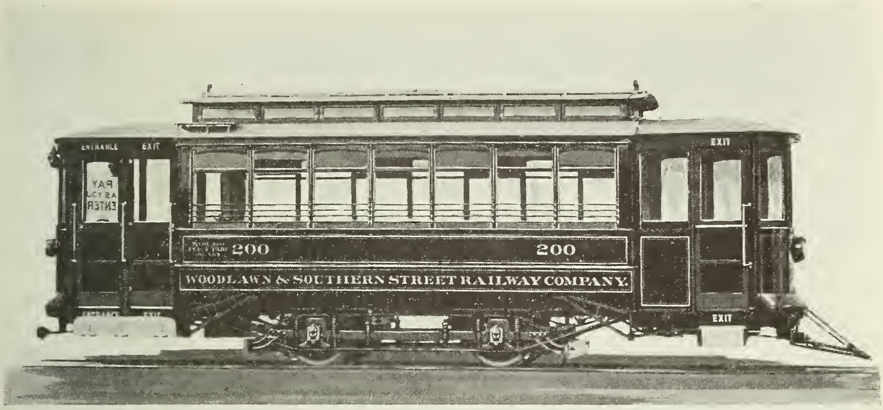


Cars for Woodlawn & Southern Railway. Floor plan of the car shown above. The platform railing surrounds a fare box and the conductor's position. Seating capacity, 38 sill, 1¾ by 4 in. The truck sub-sills are made of 8-in. I-beams. Crossings are made in truss form of 3-in. channels, with the upper member filled with wood to afford fastening for the flooring. The sill plates, truck sub-sills and crossings are securely riveted to each other with 3/16-in. gusset plates, the whole forming a strong and light underframing. The corner posts are 3⅝ in. thick; side posts, 2¾ in. thick; sweep of posts, 1¾ in.



Cars for Woodlawn & Southern Railway. The upper window sashes are stationary, and lower are arranged to drop into pockets clear of window rail

The seats, windows and interior finish are the same as in the larger cars. Single bulkheads in the body ends are arranged to enclose sliding entrance and exit doors. Platform railing extends from the bulkhead around to a wooden upright between the vestibule doors at the entrance side. These doors are hinged to the upright and fold back to back.



CARS FOR WOODLAWN & SOUTHERN RAILWAY. These cars are constructed with steel underframe of a similar type to one illustrated on page 321, Vol. 5. Mounted on Brill No. 21-E truck

The principal dimensions and weights of the double-truck cars are as follows:

Length over corner posts	33 ft. 9 in.
Length over platforms	46 ft. 6½ in.
Length of platforms	6 ft. 4¾ in.
Centers of side posts	2 ft. 5¾ in.
Width over sills	7 ft. 11½ in.
Width over posts	8 ft. 4 in.
Extreme width	8 ft. 6½ in.
From track to side sills	3 ft. 0¾ in.
From side sills over trolley boards	9 ft. 3⅛ in.
From floor to center of headlining	7 ft. 11 in.
From track to step	16 in.

From step to platform	14 in.
From platform to floor	11 in.
Seating capacity	38
Weight of car body less electrical equipment :	
Motor	21,750 lb.
Trailer	22,100 lb.
Weight of trucks:	
Motor	17,000 lb.
Trailer	11,160 lb.
Total weight, less electrical equipment:	
Motor	38,750 lb.
Trailer	33,260 lb.

The principal dimensions and weights of the single-truck cars are as follows:

Length over corner posts	20 ft. 0 in.
Length over platforms	33 ft. 0 in.
Length of platforms	6 ft. 6 in.
Centers of side posts	2 ft. 8 in.
Width over sills	7 ft. 11½ in.
Width over posts	8 ft. 4 in.
Extreme width	8 ft. 6½ in.
From track to side sills	2 ft. 2⅝ in.
Side sills over trolley boards	9 ft. 11¼ in.
From floor to center of headlining	8 ft. 6¾ in.

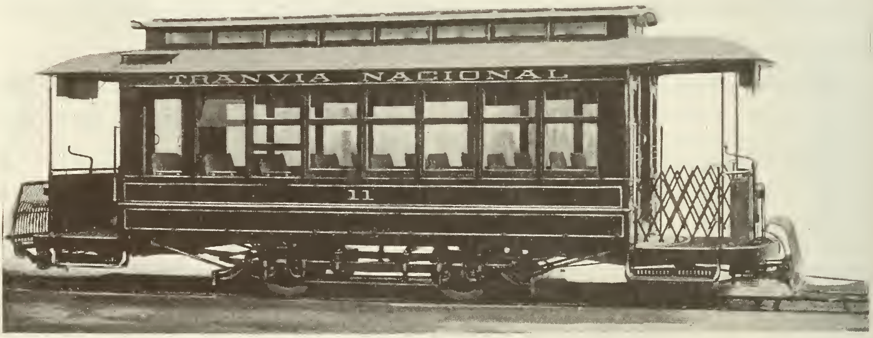
Track to step	15⅜ in.
Step to platform	14½ in.
Platform to floor	9 in.
Seating capacity	22
Type of truck	Brill No. 21-E
Wheel base	8 ft. 0 in.
Diameter of wheels	33 in.
Weight of car body, less electrical equipment	13,260 lb.
Weight of truck	6,720 lb.

MORE BRILL SEMI-CONVERTIBLE CARS FOR LA PLATA, ARGENTINA

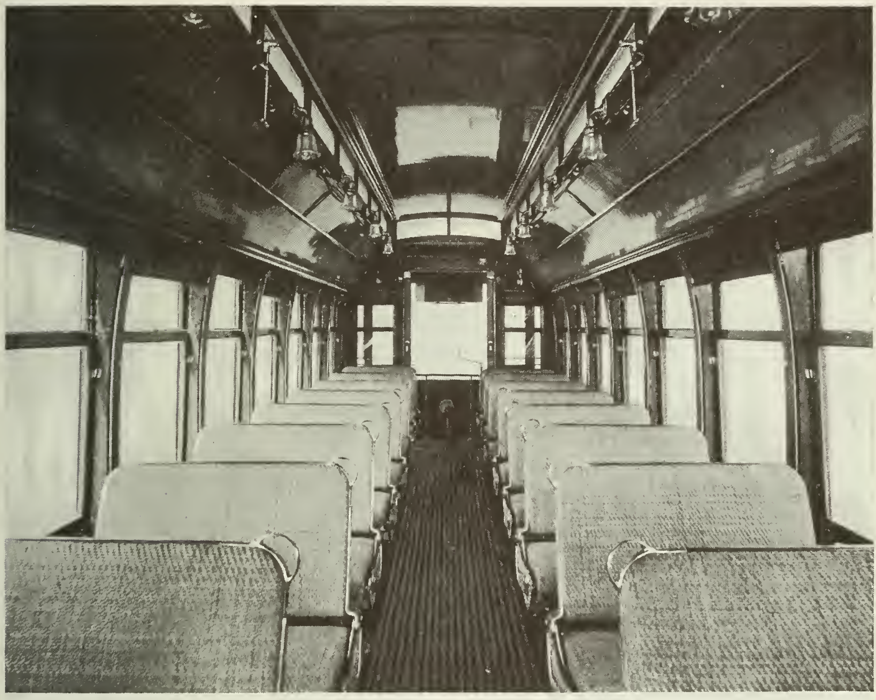
BRILL No. 21-E TRUCKS

THE J. G. Brill Company has recently shipped 10 cars of the type illustrated to the Tranvia Nacional de La Plata, which are duplicates of 10 cars shipped several years ago. After being built and painted, just as shown in the photographs, the cars were taken apart, boxed and shipped by way of New York to Buenos Ayres and transshipped to La Plata. The city of La Plata is an hour's ride by train from Buenos Ayres and is situated about 20 miles southeast of the metropolis, at the mouth of the La Plata River. It has a population of 100,000 and is a busy and prosperous city, with an excellent tramway system, railway connections with all parts of the republic and steamship connection with important cities on the river and coast.

The cars are similar to the single-truck cars of the Lacroze system, Buenos Ayres, except that the platforms are not vestibuled. The bottom framing consists of double side sills, 2¾ by 8 in. and 1¾ by 8 in., with a 10 by ¼-in. steel plate



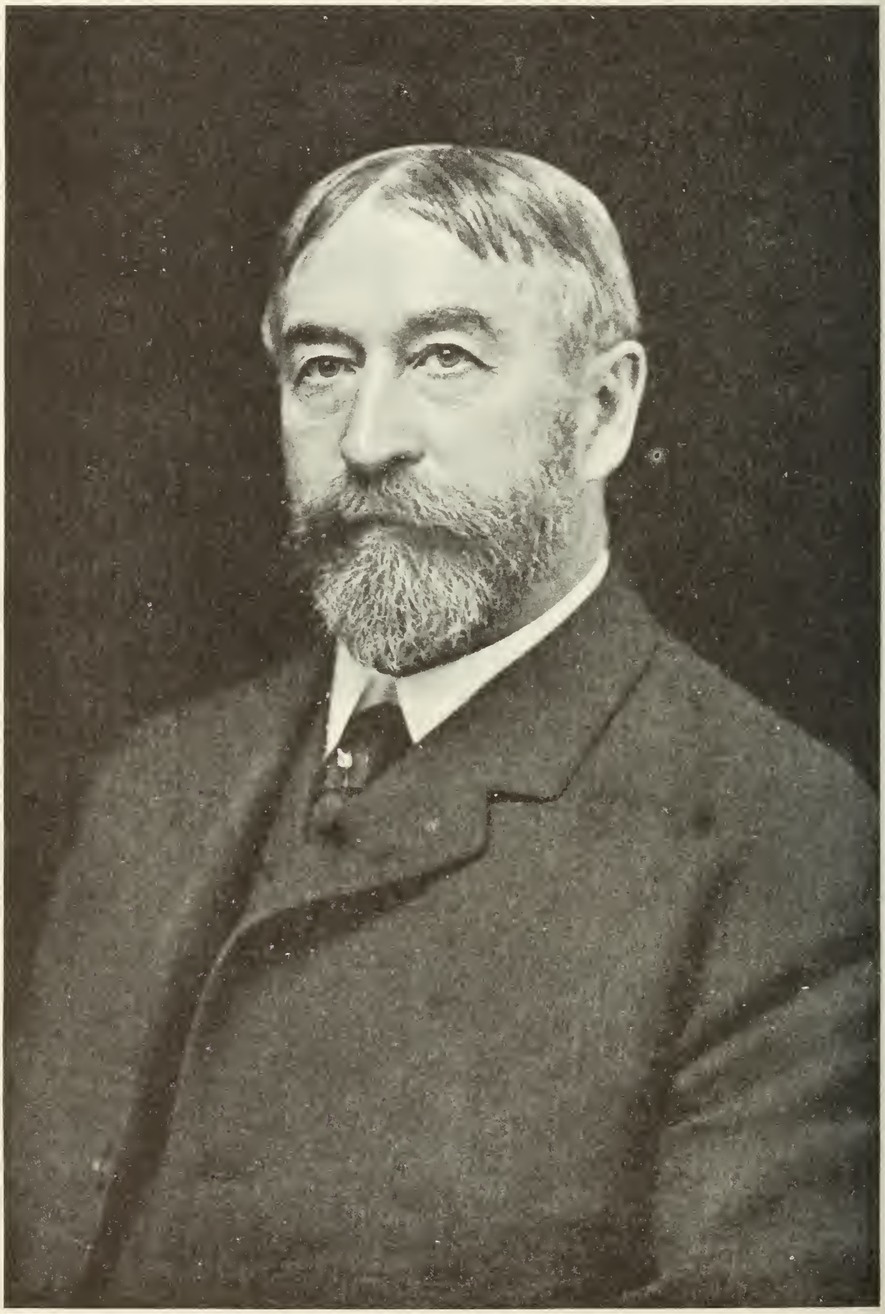
CARS FOR LA PLATA, ARGENTINA. Brill standard semi-convertible type mounted on Brill No. 21-E truck



Cars for La Plata, Argentina. The seats are of the Brill "Winner" type. No longitudinal corner seats. Seating capacity, 32

on the inside; end sills, 4½ by 8-in. oak; crossings, 3½ by 4¾ in. oak; inside truss rods, 2 by ½ in., with ⅞-in. round corners, are brought through the end sills. Thickness of corner posts, 3⅝ in. and side posts 3¼ in.; sweep of posts, 1¾ in.; 7 compound rafters support the roof. The interiors are finished in cherry, with ceilings of 3-ply birch veneer.

Length over corner posts	21 ft. 4 in.	From track to step	15 in.
Length over platforms	30 ft. 4 in.	From step to platform	13 in.
Length of platforms	4 ft. 6 in.	From platform to floor	7 in.
Centers of side posts	2 ft. 5 in.	Seating capacity	32
Width over sills	8 ft. 1¾ in.	Type of trucks	Brill No. 21-E
Width over posts	8 ft. 4¼ in.	Wheel base	7 ft. 6 in.
Extreme width	8 ft. 7¾ in.	Diameter of wheels	33 in.
From track to side sills	2 ft. 7⅝ in.	Size of journal	diameter 3¾ in.
From side sills over trolley boards	9 ft. 1⅛ in.	Type of motors	Brit. West. 200—2
From floor to center of head-lining	8 ft. 6¼ in.	Weight of car body (less elec. and air equip.), truck and fenders	19,000 lb.



JAMES RAWLE

JAMES RAWLE, president of The J. G. Brill Company, died at his home, "Castlefinn," Bryn Mawr, Pa., May 1st, after a short illness. Mr. Rawle was born in Lancaster, Pa., November 15th, 1842. He was graduated a Bachelor of Arts from the University of Pennsylvania in the class of 1861 and received his Master's degree in 1864. He adopted the profession of civil engineer and for several years was a member, with Frank Thomson and A. J. Cassatt, of the engineering corps which laid out the lines of the Philadelphia & Erie Railroad. In 1872 he purchased an interest in the car building business founded in 1868 by John George Brill and his eldest son George Martin Brill, and became the financial manager of the firm. When the company was incorporated in 1887 he was elected secretary and treasurer and held these offices till the death of George Martin Brill in 1906, whom he succeeded as president. George Martin Brill, John A. Brill and Edward Brill were his close friends and associates, and together they built up the business of The J. G. Brill Company, as outlined in a series of articles by Mr. Rawle, entitled "A History of The J. G. Brill Company," published in BRILL MAGAZINE during 1911. Mr. Rawle was essentially a man of large affairs and one who might well be selected as typifying the best characteristics of the leaders of great enterprises. His alert and far-seeing mind and keen business instincts were perfectly balanced by an inborn sense of justice and fair play. He was in every way an admirable man and had the affection as well as the esteem of his entire business staff.

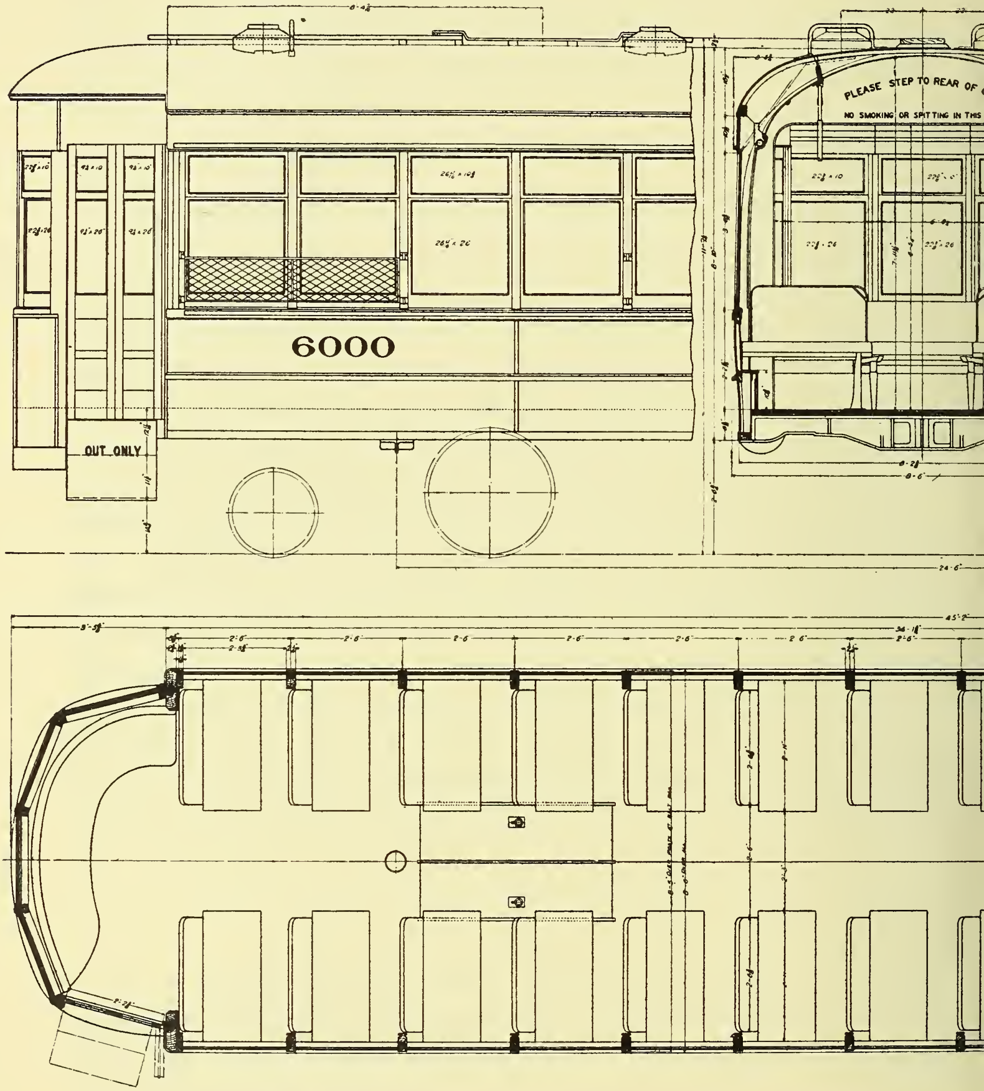
Mr. Rawle was a director of the Central National Bank, member of the board of managers of the Philadelphia Saving Fund Society, director of the Bryn Mawr Trust Company, member of the board of directors of DeLancey School and a trustee of Bryn Mawr Hospital. He was a member of the Philadelphia Club, the University Club of Philadelphia, Radnor Hunt Club, Merion Cricket Club, Tobique Salmon Club and the Broadwater Club. For several years he was an officer of the celebrated First Troop, Philadelphia City Cavalry. His son, Edward P. Rawle, is assistant treasurer and a director of The J. G. Brill Company.

The following minute has been made upon the records of the board of directors:

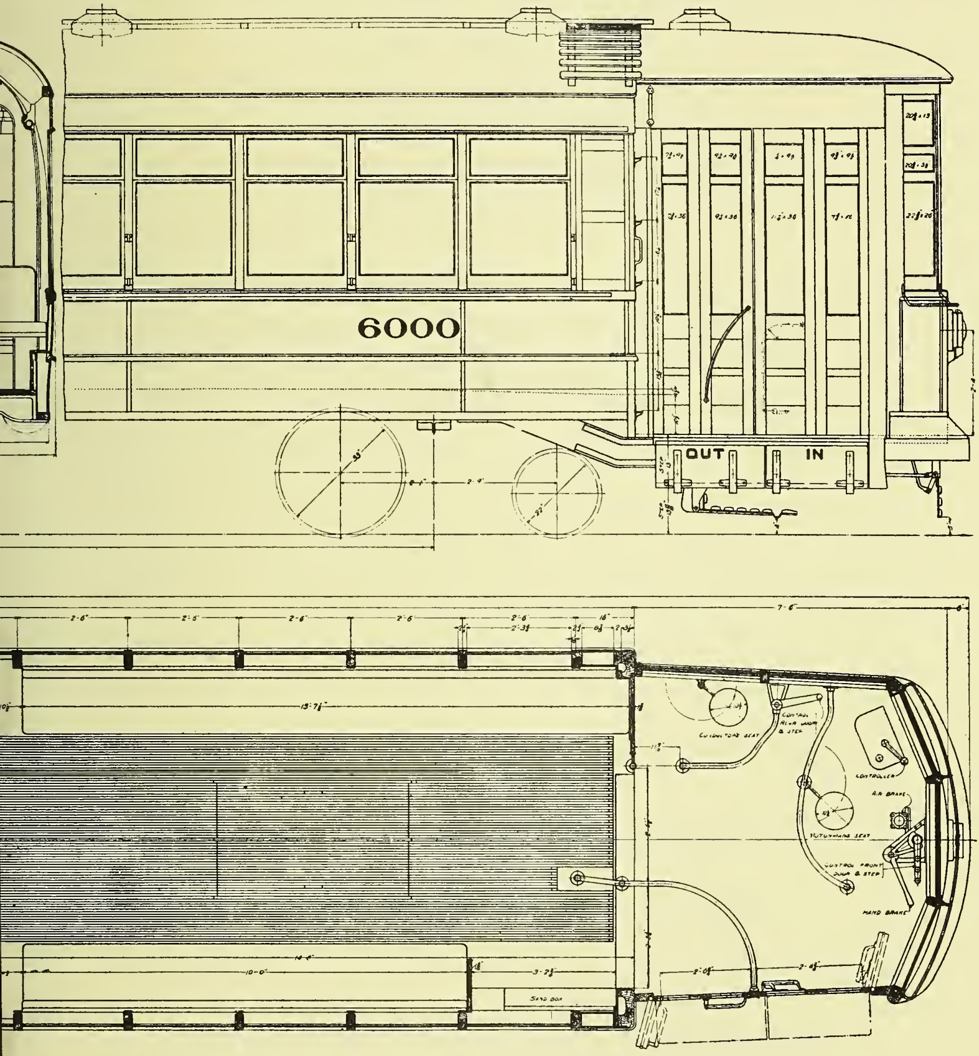
"The board of directors of The J. G. Brill Company record with a deep sense of loss the death of James Rawle, president, on May 1st, 1912. He was financial manager of the original firm of J. G. Brill & Company and secretary and treasurer of the company into which it was incorporated from 1887 till 1906, when he was elected president. Every thought and act during his entire administration of these offices were for the strengthening of the foundations of the business to which he gave the best of his life. He was all that an executive should be in every attribute of character and mind and endeared himself to his fellow directors by a remarkably generous and kindly disposition which dominated his strong and keen mind. He had completed his three score and ten years and has gone hence, leaving a highly honored name, a great and firmly established business enterprise, a number of strong financial institutions and many philanthropic interests owing much to his direction and support, and a wide circle of friends."

At a meeting of the board of directors of The J. G. Brill Company, held May 7th, Samuel M. Curwen was elected president and Edward Brill, vice-president. William H. Heulings, Jr., was elected a director.

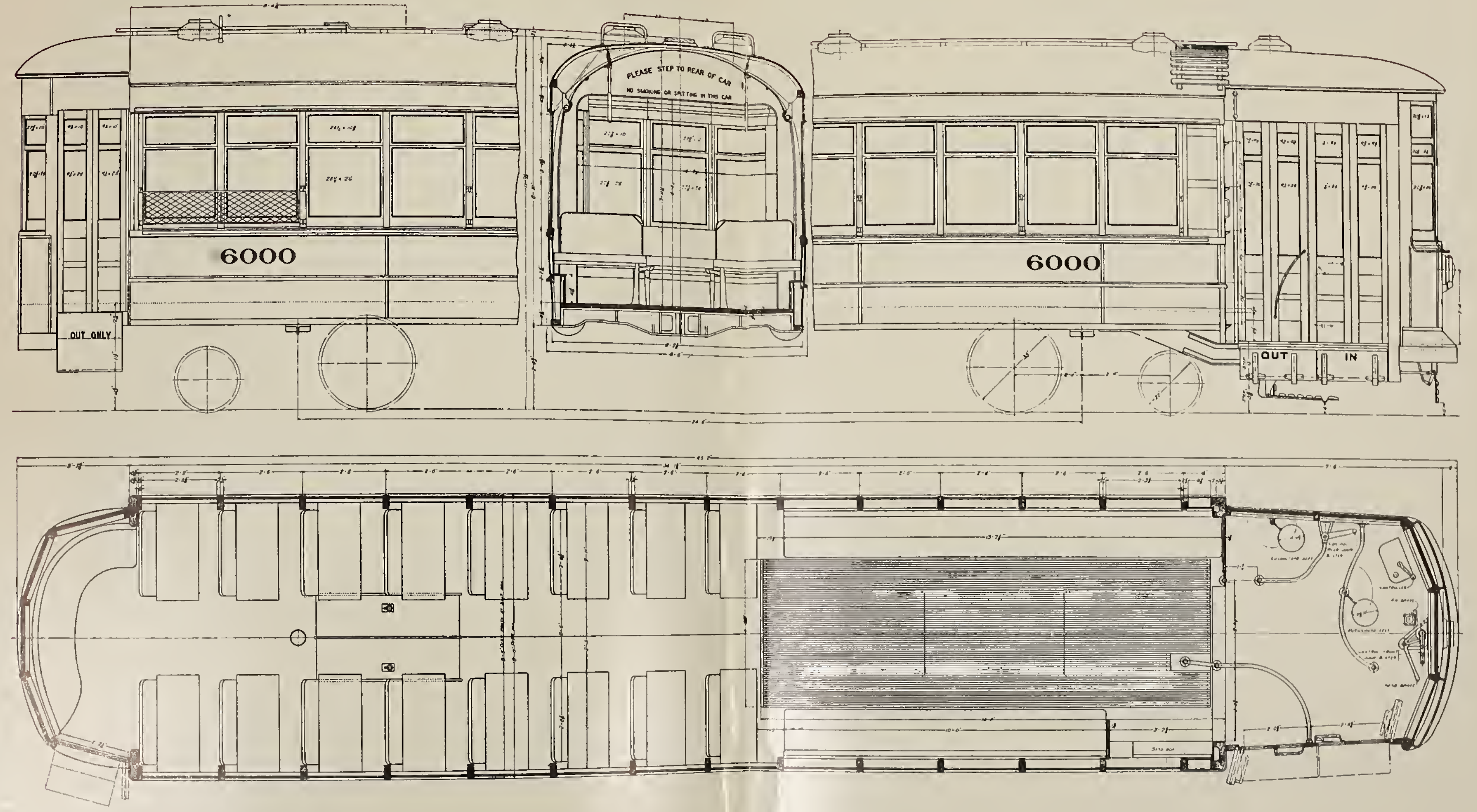
THE “NEARSIDE” CAR OF THE PHI



DELPHIA RAPID TRANSIT COMPANY



THE “NEARSIDE” CAR OF THE PHILADELPHIA RAPID TRANSIT COMPANY


PLEASE STEP TO REAR OF CAR
NO SMOKING OR SPITTING IN THIS CAR
6000
OUT ONLY
6000
OUT
IN

SUPPLEMENT TO BRILL MAGAZINE, MAY, 1912

Form 525

THE J. G. BRILL COMPANY

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G. C. Kuhlman Car Company,	Cleveland, Ohio
John Stephenson Company,	Elizabeth, N. J.
Wason Manufacturing Co.,	Springfield, Mass.

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China	Shewan, Tomes & Co., Hong Kong, Canton, Shanghai
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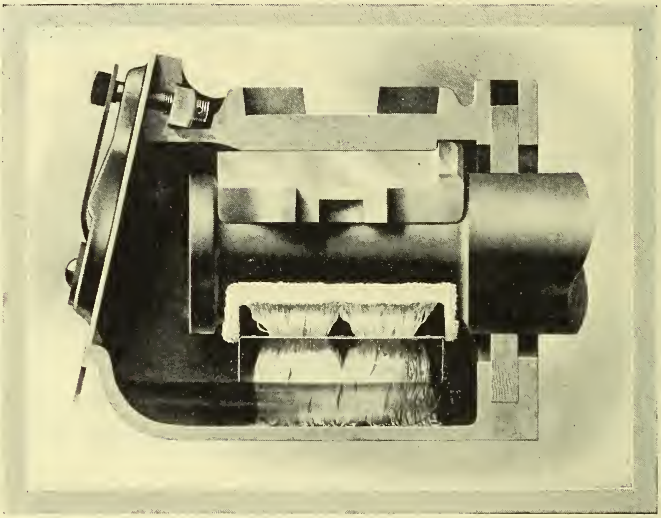
Write the new address on the envelope in which this Magazine is received and return the envelope to the Publicity Department, The J. G. Brill Company



BRILL STANDARD JOURNAL BOX

This box is made of semi-steel, which means that a proper percentage of steel is used in the casting. This adds considerably to its strength but does not give it a degree of hardness that would produce undue wear of the pedestals. The shape is worthy of careful study, it is not unnecessarily heavy and the metal is all used to the best advantage (the illustration shows one in which the wedge is made an integral part of the box and it is also made to take a wedge for M. C. B. trucks). Each box is carefully machined to give a tight fit to the lid and a smooth, close fit for the pedestals. Note that the oil well or cellar is the same height back and front, preventing waste while filling. Also be sure to note the unbreakable pressed steel lid and its shape and attachment, for no lid has ever been designed that has given such uniform satisfaction.

THE J. G. BRILL COMPANY

PHILADELPHIA - - - PENNSYLVANIA

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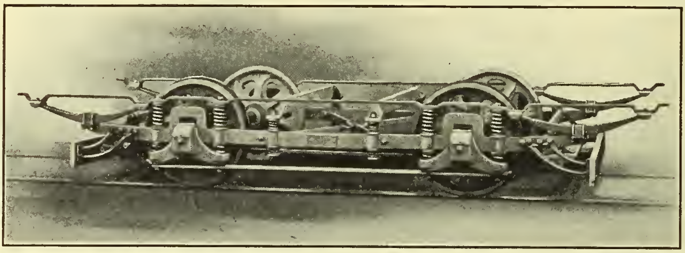
Vol. VI. JUNE, 1912 No. 6

BRILL MAGAZINE

Torvet (Market Square)
Christiania, Norway



BRILL SINGLE-TRUCK No. 21-E

See advertisement (on the back cover) of the Brill Wide Wing Journal Box and note this equipment in the above illustration. The eight large diameter coil springs, resting in pairs in the extended wings of the boxes, afford the longest spring base to the frame, of any truck of equal wheel base in the market, giving increased stability to the carbody. Having no journal springs on top of the boxes enables the carbody to be carried two inches lower. The easy riding body springs with long spring base obtained by semi-elliptics on the frame extensions complete the ideal arrangement of the spring system. Brill Half Ball Brake Hangers are a standard part of the equipment. The long life of the truck is mainly due to the solid forged side frames. Catalog sent on request.

THE J. G. BRILL COMPANY
PHILADELPHIA - - - PENNSYLVANIA

J. E. Blain

President of the Municipal Tramways Association of Great Britian

SUPPLEMENT TO BRILL MAGAZINE
JUNE, 1912

BRILL MAGAZINE

Vol. VI JUNE, 1912 No. 6

HERBERT E. BLAIN

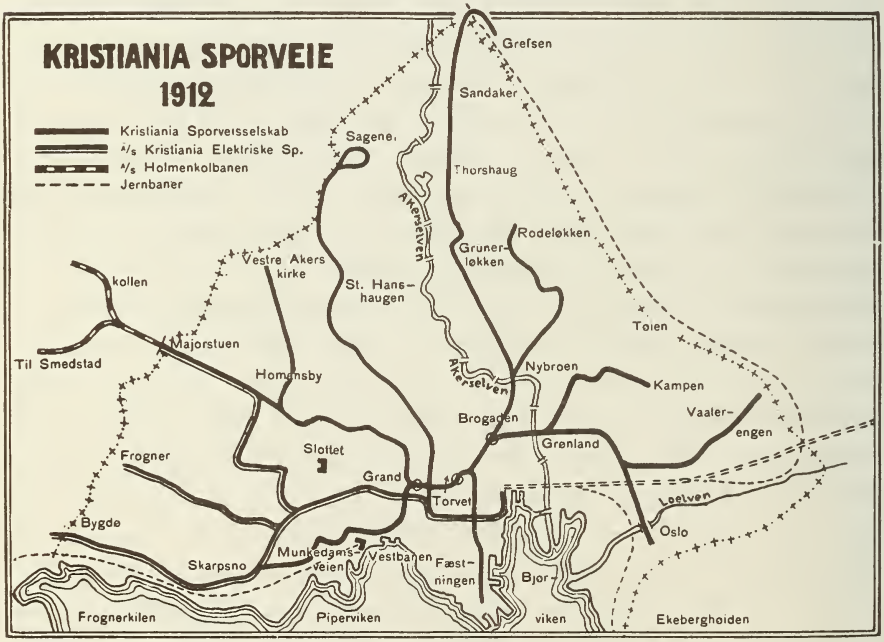
[WITH PORTRAIT INSERT]

HERBERT E. BLAIN, president of the Municipal Tramways Association of Great Britain, was born in Liverpool, England, in 1870. He entered the service of the Liverpool Corporation, and, upon the acquirement by the city of the tramways undertaking, which had previously been operated by a company, became a member of the tramway staff under the late C. R. Bellamy and went through the reorganization period consequent upon the reconstruction of the tramways undertaking from horse to overhead electric traction. In 1903 he was appointed the first tramways manager of the municipal tramways undertaking which was being commenced in the county borough of West Ham, an industrial town of some 300,000 inhabitants immediately adjacent to London on the east side. This undertaking has been very successful, and Mr. Blain, as a firm believer in the extension of public traveling facilities, has been largely instrumental in bringing about the through-running arrangements under which so many of the individual tramway systems in the metropolitan area have now mutual traffic facilities irrespective of the boundaries of the various local authorities. He is an ex-chairman of the Metropolitan Association of Electric Tramway Managers, and is president for the year 1911-12 of the Municipal Tramways Association (Incorporated), an important organization whose membership consists of the chairmen, vice-chairmen and managers of the municipal tramways undertakings of Great Britain. He is the joint author of a textbook, "Office Organization and Management," and of several other works.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

CHRISTIANIA, NORWAY*

CHRISTIANIA, the capital of Norway, the residence of the king, and the seat of the government, has a population of 250,000 and is situated on the southern coast at the head of the Christiania-fjord, about 80 miles from the open waters of the Skaggerack. A narrow river runs through the city, with rising ground on either side and a background of steep pine-wooded hills. The harbor is of two parts, divided by a promontory having the picturesque old fortress of Akershus. At the head of the eastern harbor is the prin-



CHRISTIANIA TRAFFIC CONDITIONS AND CARS. The tramways are operated by three different companies as indicated on the map. Dotted lines indicate steam railways. There are no belt lines, as practically all the travel is to and from the center of the city cipal railway station and square, from which extends the main street, Karl Johans Gade, on which face the houses of parliament, university, cathedral, national theater, and at the head is the royal palace. The part of this street shown in the photograph below is the principal promenade of the capital. Eidsvolds Plads, a large square on Karl Johans Gade, is the center of life and gaiety, and is surrounded by cafes and restaurants and extends as far as the houses of parliament. Eastward is Torvet, shown on the front cover, the main market square which has the cathedral, the bank and the chief fire brigade station. Several important streets radiate from the Torvet, including Stor Gaden and Groensen, both of which carry heavy tramway traffic. The principal street crossing the city north and south is Akers Gaden, which starts at the

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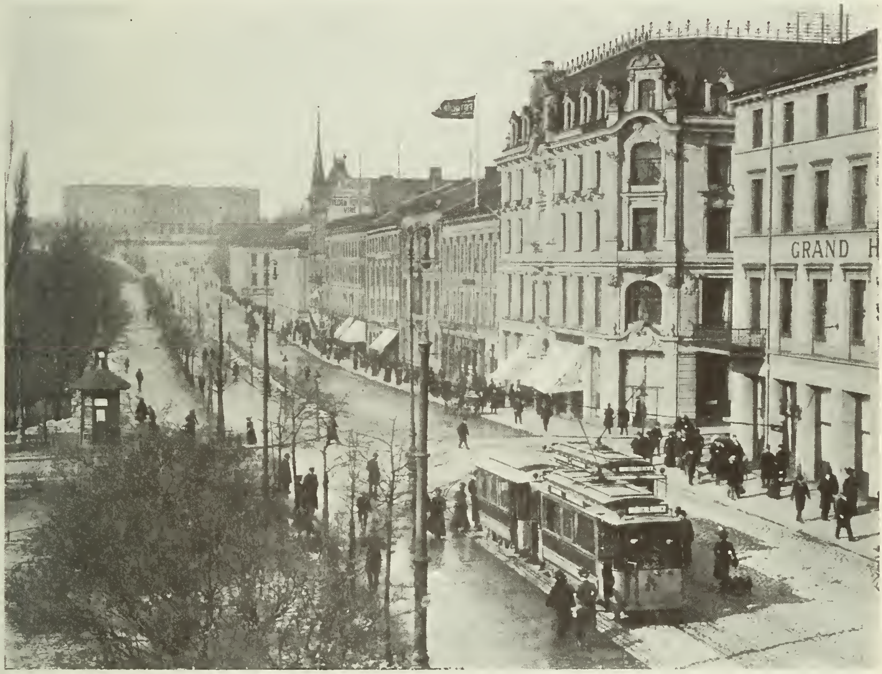
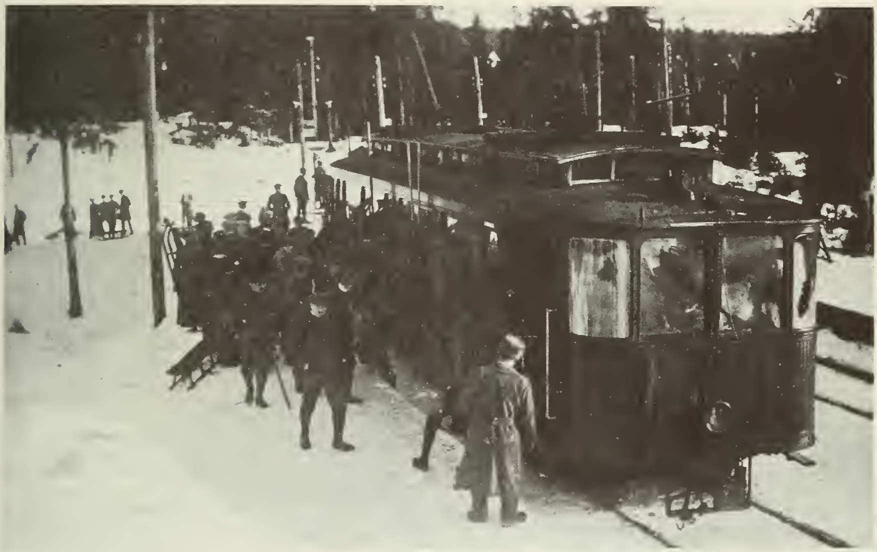
* The forty-second article of this series.



Christiania Traffic Conditions and Cars. Karl Johans Gade, the principal street of the capital, extends one mile eastward from the royal palace, which is shown, to the eastern union railway station castle on the promontory between the harbors, crosses Karl Johans Gade at the houses of parliament and extends beyond the municipal boundary. The city is nearly all modern, with splendid public buildings, handsome hotels and shops, and beautiful residences. The business district of Christiania is at the center, the fine residence section is in the western part, and, except for two large shipbuilding yards, most of the industrial plants are concentrated in the northern part, where many obtain their motive power from the waterfalls of the River Aker. The main supply of electric current for manufacturing and traction purposes is furnished by the municipal central power station, which is supplied from distant hydro-electric plants and also from a steam turbo-electric plant, with large storage batteries partly held in reserve for the peak loads. The industries embrace cotton and woolen spinning and weaving, paper, flour, soap and oil, bricks and tiles, matches, nails, margarine, foundry and machinery shops, wood pulp, tobacco, together with sawmills, breweries and distilleries. There is regular passenger and freight steamship

Christiania Traffic Conditions and Cars. Storting Gade, an important street which parallels Karl Johans Gade and whose lines serve the southwestern part of the city



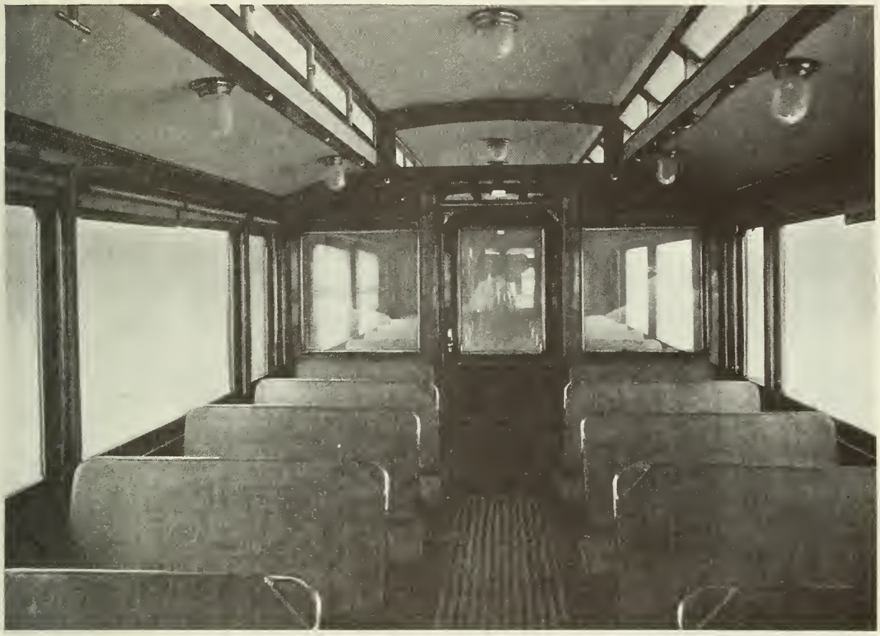
Christiania Traffic Conditions and Cars. The Holmenkolbanen is a tramway system which extends from the western city boundary to the tops of the hills which surround the landward side of the city and which are popular resorts both summer and winter

service between the principal ports on the North and Baltic Seas. The harbor and piers are large and modern, and the water in the fjord is kept open in winter by the use of powerful ice-breakers. From two union stations railways radiate to the principal cities of the kingdom and Sweden. With all these means of communication, both by sea and land, Christiania is at once the commercial metropolis of Norway and the principal center of the extensive tourist traffic.

All the tramway lines radiate from the central section of the city between the two harbors and the two railway stations. There are no belt lines, and consequently practically all traffic comes into and goes out of this center, resulting in considerable congestion at a number of points at certain hours of the day and on holidays. The superior character and condition of the track, overhead material and cars, and the advanced methods of operation, indicate a progressive management and an excellent organization governing each of the electric tramway systems, which are owned and operated by three different companies. All have standard gage track and use direct current at a working potential of 550 volts. The tracks are laid on a foundation of stones one meter deep, necessary because of the deeply frozen ground in winter.

The largest system is operated by the Christiania Sporveisselskab, which was the first street-car system in Scandinavia. This company has in its concession a clause which compels it to extend the lines a certain amount each year, and is now planning a suburban line over a hilly plateau in the southeastern part of the city. The second in extent of trackage is the Christiania Elektriske Sporvei, one of the oldest electric tramways in Europe. Its main line runs from the eastern railway station to the Majorstuen on the western city border, where it connects with the Holmenkolbanen, the third tramway system. The Holmenkolbanen is a mountain railway which is very popular in both summer and winter. The favorite points for winter sports are in the hills along the line and at the terminus; every day, when the weather is fine, the cars are loaded to their full capacity, and the sleds and skies

Christiania Traffic Conditions and Cars. Standard type of double-truck car recently adopted

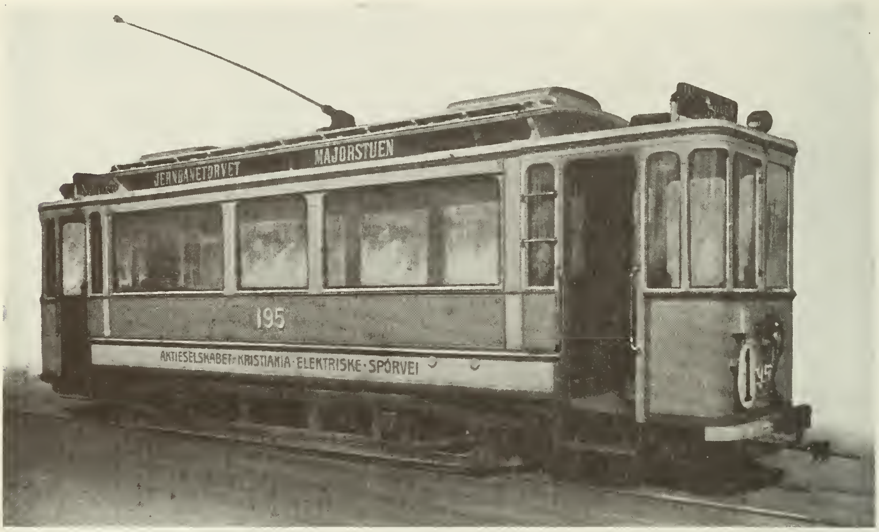


CHRISTIANIA TRAFFIC CONDITIONS AND CARS. Interior of car shown on opposite page

of the passengers are hung on hooks on the outside of the cars. In the summer, large numbers of excursionists are carried to the hills, where magnificent views of the city and fjord are obtained. Many fine residences have been built along the lines, and the cars are receiving an increasing number of regular patrons. Work has commenced on a subway through which the cars will reach central points in the city.

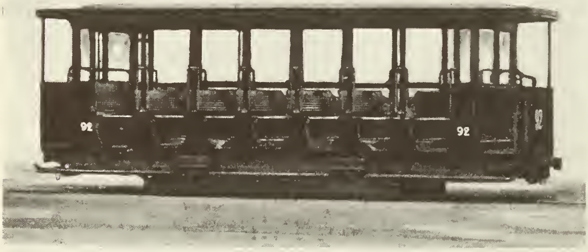
The double-truck car illustrated is the latest type placed on the lines, and these cars are equipped with four motors and multiple-unit control. The general dimensions are: Length over end panels, 10.795 m.; length over platforms, 14.155 m.; length over all, 14.335 m.; width over all, 3.030 m.; weight of car and trucks fully equipped, 24 tons.

The single-truck cars have the following dimensions: Length over end panels, 6.200 m.; length over platforms, 10.500 m.; length over all, 11.500 m.; width over all, 2.000 m.; weight of car and truck completely equipped, 9.4 tons.



CHRISTIANIA TRAFFIC CONDITIONS AND CARS. The largest part of the motor-car equipment consists of this type

The latest cars of this type are equipped with the series-parallel system and have commutating pole motors. For heavy traffic period of the day and on stormy days when the number of passengers frequently doubles, the motor cars are called upon to draw two or three fully loaded trailers, and, as the gradients are steep and the curves sharp, the demand on the motor equipment is heavy but is fully met by the commutating pole type. The usual fare is 10 oere (about 3 cents); there is also a 5 oere ticket on early workingmen's cars and for children under 12 years of age. The tickets issued permit a transfer to other cars on a corresponding system without extra charge.

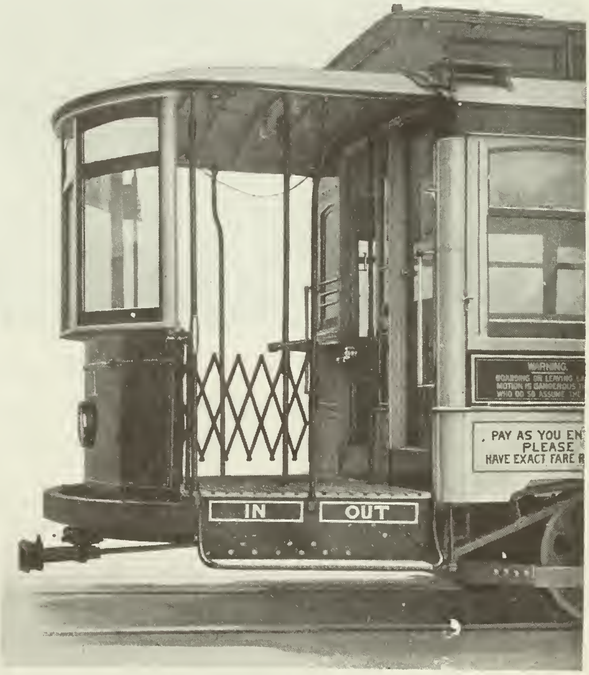


CHRISTIANIA TRAFFIC CONDITIONS AND CARS. Open and closed trailer cars are used to handle the rush-hour traffic and in holiday service

SIXTY MORE SEMI-CONVERTIBLE CARS FOR BALTIMORE

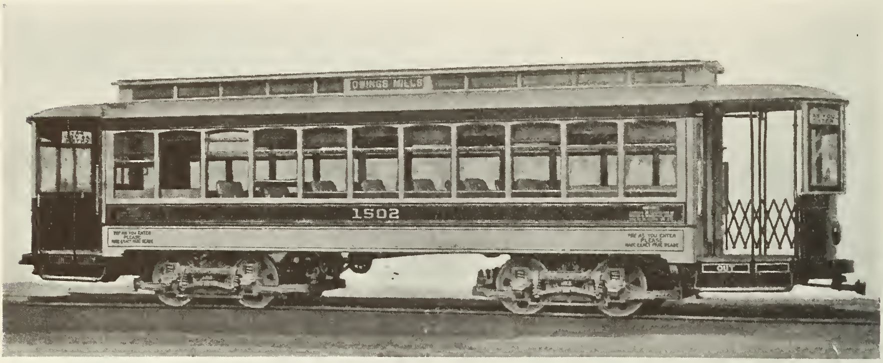
BRILL No. 27-GE1 TRUCKS

THE United Railways & Electric Company of Baltimore has placed in commission within the last few weeks 60 cars, built by The J. G. Brill Company, which are almost identical to 60 furnished about a year ago. These cars have been assigned to the Gay and Baltimore Street line, which operates through the section of heaviest traffic, and are much needed to augment the regular equipment during the period of the National Democratic Convention during the latter part of this month. Three other of the principal lines, equipped with the former lot of pay-as-you-enter cars, have proved very satisfactory to the public and to the company. A count made during the evening rush hour indicates that the average rate of loading these cars is about 1¾ seconds per passenger.



Cars for Baltimore. The pay-as-you-enter railing slides up out of the way, leaving front platform unobstructed

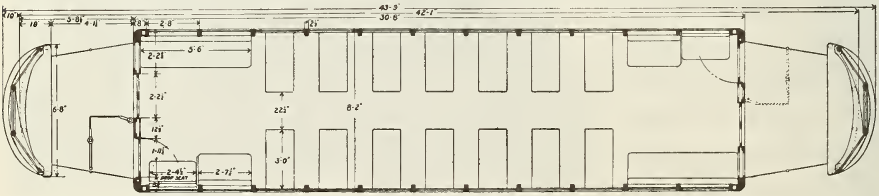
The side sills of the bottom framing are made up of 2¾ by 6⅞-in. long-leaf pine, and



Cars for Baltimore. Sixty cars comprising this order are practically the same as an order of 60 furnished a year ago. The trucks are also the same and are Brill No. 27-GE1 type

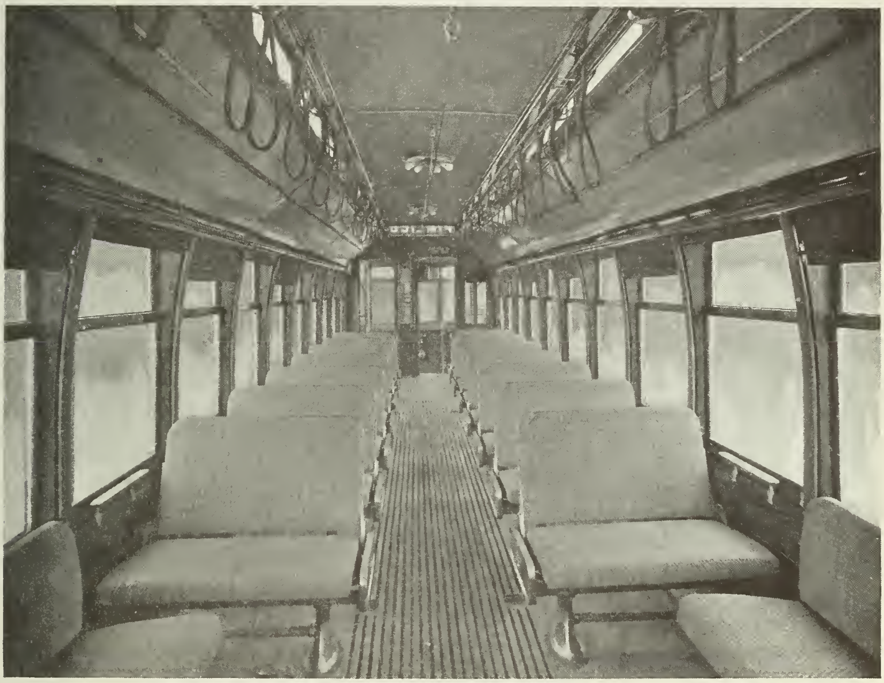
1¾ by 5¼-in. members of the same with 16½ by 5/16-in. plate between; the stringers are 3½ by 4½ in. and the crossings 3½ by 4½ in.; the end sills are made of 10-in. channels. The framing is securely braced by 3 by 1½-in. diagonal braces and the end sills and side sills are connected at the corners on the inside by forged corner brackets extending 12 in. along each sill; tie rods are placed along the side of each center and intermediate crossing in the form of a truss; the center plates are arranged so that oiling can be done from the interior of the car, standard ⅜-in. pipe being used for the purpose. The platforms are supported on four channel knees of the open truss type.

The body brake rigging is composed of two large cast iron sheaves and one small sheave, all mounted on a 2-in. square steel shaft and supported on cast iron brackets attached to the underframe; chains are secured to the larger sheaves and connected to the brake rods leading to the brake shafts. The



Cars for Baltimore. Seating plan is generally similar to cars which have been in operation on the Baltimore lines since 1905. Seating capacity, 42 chain on the small sheave is attached to the push rod of the brake cylinder. This brake system is very compact, is quiet in operation and there is practically no wear on the various parts.

The body framing consists of straight grained white ash corner posts, 4¾ in. thick, and side posts 2½ in. thick; the top rail, belt rail and concave rail are of Oregon pine. The posts at the top are provided with malleable iron brackets, fastened through the posts with ¼-in. bolts and screwed to the post rails and letter board. These brackets extend down the side of the posts 4½ in. and along the top rail the same distance. The steel members of the compound carlines are 1¼ by ½ in. and the wooden members are extra wide to receive the screws from the trolley board.



Cars for Baltimore. Brill semi-convertible window system is standard in cars of the United Railways & Electric Company. Interior is finished in cherry

The window system is the Brill standard semi-convertible type, which has long been used on the cars of the United Railway & Electric Company. The door arrangement in the body end consists of a double sliding entrance door and a single swinging door for exit. The pay-as-you-enter railing slides up and down on two uprights and is held in the upper position by a substantial catch. Folding gates enclose the far side of the platform and light "portable vestibules" enclose the ends. The trucks are generally similar to a lot of 120 recently furnished and have the United Railway & Electric Company's standard sliding brake arrangement.

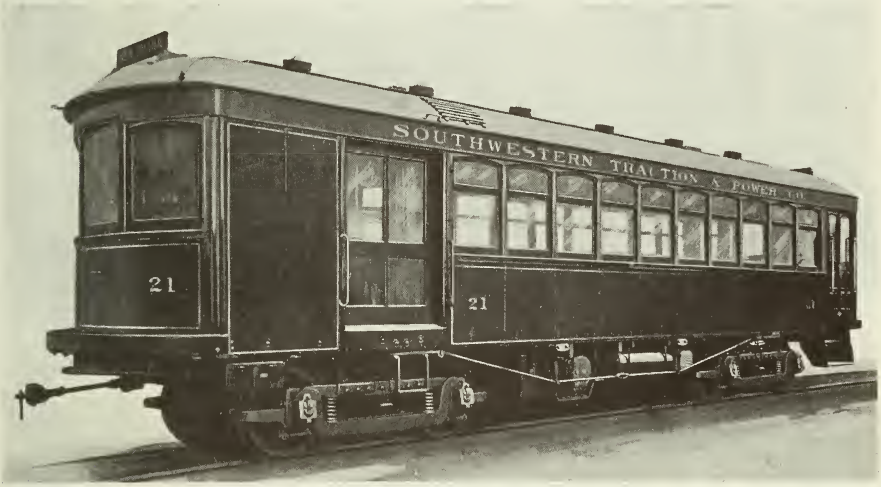
Length over corner posts	30 ft. 8 in.	Seating capacity	42
Length over platforms	42 ft. 1 in.	Type of trucks	Brill No. 27-GE1
Length of platforms	5 ft. 8½ in.	Wheel base	4 ft. 6 in.
Centers of side posts	2 ft. 8 in.	Diameter of wheels	33 in.
Width over sides	8 ft. 2 in.	Size of journals	4 in.
Extreme width	8 ft. 5 in.	Type of motors	GE246—4-50 hp.
From track to side sills	2 ft. 10½ in.	Wt. of body less elec. equip.	16,000 lb.
From side sills over trolley boards	9 ft. 0 in.	Wt. of electrical equipment	1,400 lb.
		Wt. of air brake equipment	1,500 lb.
Track to step	16⅜ in.	Weight of trucks	12,320 lb.
Step to platform	15⅛ in.	Weight of motors	9,400 lb.
Platform to floor	9⅞ in.	Total weight	40,620 lb.

CARS FOR THE SOUTHWESTERN TRACTION & POWER COMPANY

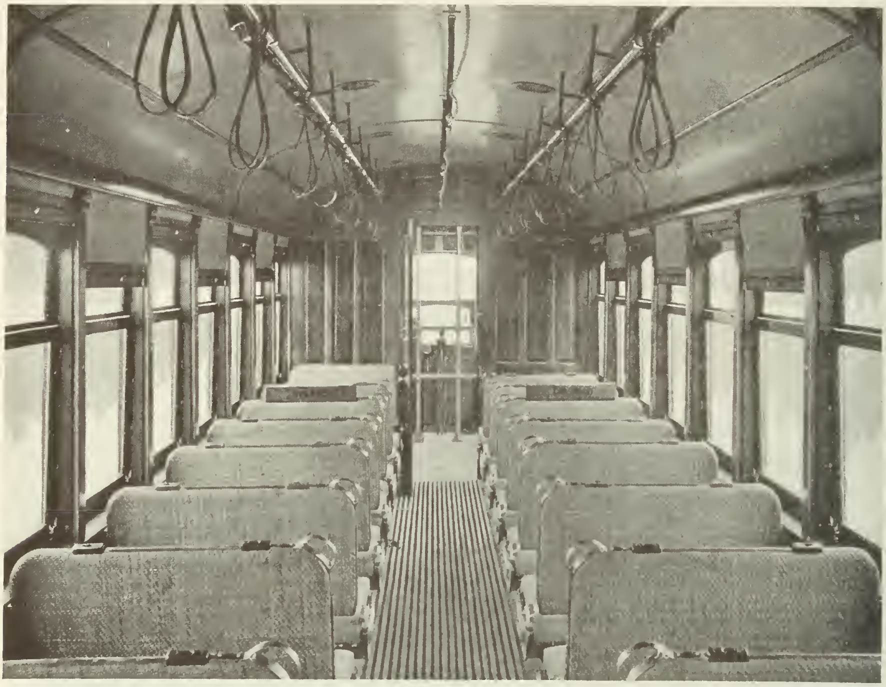
BRILL No. 27-MCB1 TRUCKS

THE Southwestern Traction & Power Company is a new system in southwestern Louisiana which started operation in April with cars of the type illustrated, furnished by the American Car Company. The line starts at New Iberia and runs in a southeasterly direction to Jeanerette, a distance of 12½ miles. Further construction will commence in a few weeks and eventually the line will comprise 60 miles of trackage built for high-speed operation. The line parallels the Southern Pacific Railroad in a rich farming section between the great sugar cane and rice sections, for which the State is famous. New Iberia is about 125 miles west of New Orleans and in the center of the beautiful and thickly settled country known as Arcadia, famous in literature especially as the scene of Longfellow's "Evangeline."

The line is equipped and operated in a distinctly modern manner and is arranged for 1200 volts dc. The cars correspond with the general equipment and are exceedingly well adapted to the character of service of the lines. They are built on wooden underframes, reinforced with 15 by ⅜-in. steel sill plates, are sheathed with steel on the outside and have an inside lining of steel below the belt rail. As the cars are for single-end operation, there is a platform at one end only, and this is flush with the car floor and has folding doors and steps with traps at each side. The baggage compartment, at the front end, is equipped with a protecting rail for motorman, 4-ft. sliding doors on each side, single swinging door in hardwood partition and folding slat seats. The three windows at both front and rear ends are arranged to drop into pockets.



Cars for Southwestern Traction & Power Co. Cars are sheathed with steel and have Brill Plain Arch roofs. Mounted on Brill No. 27-MCB1 trucks



CARS FOR SOUTHWESTERN TRACTION & POWER CO. Seats are of Brill "Winner" type and with longitudinal corner seats for two passengers each have a capacity of 40 for the compartment; folding seats in baggage compartment accommodate four additional passengers

The main compartment has double sash windows, the lower arranged to raise and the upper stationary. Ventilation in the wet season, when the windows are all closed, is furnished by means of twelve Globe ventilators in the Brill Plain Arch roof. On each side of the aisle are nine Brill "Winner" seats, and at the rear corners are longitudinal seats for two passengers each. The interior finish is mahoganized birch, with composition board for the headlining.

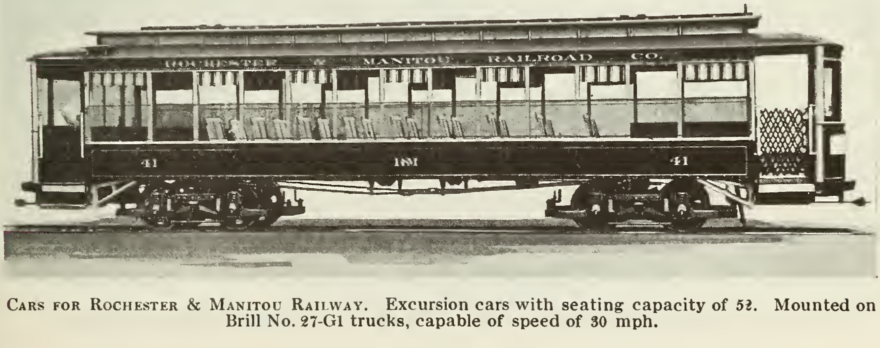
Length over corner posts	37 ft. 5 in.
Length over platform	42 ft. 5 in.
Length of platform	5 ft. 0 in.
Length of baggage comp.	10 ft. 1 in.
Length of passenger comp.	27 ft. 4 in.
Centers of side posts	2 ft. 8 in.
Width over sides	8 ft. 4 in.
Extreme width	8 ft. 4 in.
From track to sills	3 ft. 9¾ in.
From sills over trolley boards	9 ft. 1¾ in.

From floor to center of headlining	7 ft. 11¾ in.
From track to first step	17½ in.
Risers	13½ in.
Seating capacity	44
Type of trucks	Brill No. 27-MCB1
Wheel base	6 ft. 6 in.
Diameter of wheels	33 in.
Type of motors	GE-217—4-

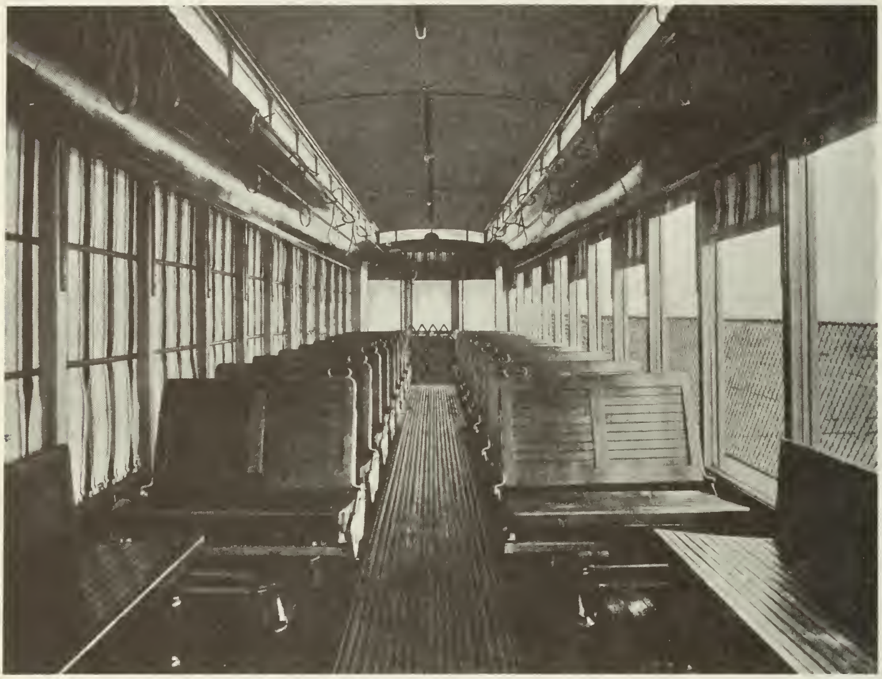
CENTER-AISLE OPEN CARS FOR THE ROCHESTER & MANITOU RAILWAY

STEEL UNDERFRAMES

THE G. C. Kuhlman Car Company delivered about April 1st three cars of the center-aisle open-vestibuled type to the Rochester & Manitou Railway to aid in handling the increased excursion business on the lines. This road operates only during the summer months, running out of Rochester to Manitou Beach Park on Lake Ontario, a distance of 7¼ miles. The cars are for double-end operation and are mounted on Brill No. 27-G1 trucks, capable of a speed of 30 miles an hour. They are built with low sides, extending only to the level of the seats, above which is a strong wire screen, 24-in. wide, made in two sections and substantially secured to the posts. Waterproof duck curtains with the edges set well into grooves in the posts can be drawn close down on the window rail. The vestibule sashes are arranged to drop into pockets. Eighteen ash slat seats of the Brill "Winner" type and longitudinal corner seats, accommodating 4 each, give a seating capacity of 52. Two pipe stanchions are placed on the end sill at each end of the car and provided with a folding gate to

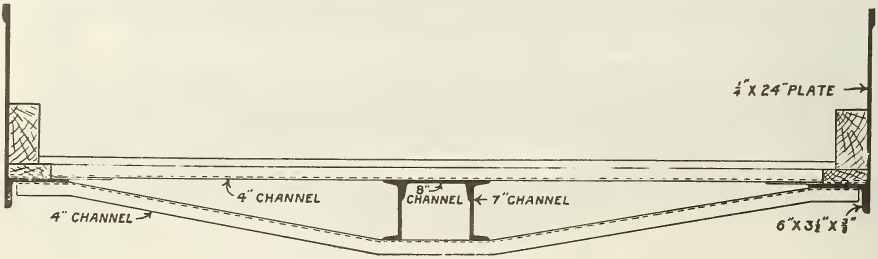


CARS FOR ROCHESTER & MANITOU RAILWAY. Excursion cars with seating capacity of 52. Mounted on Brill No. 27-G1 trucks, capable of speed of 30 mph.



CARS FOR ROCHESTER & MANITOU RAILWAY. Folding gates between stanchions placed on the end sills keep passengers from front platform. Curtain above gate cuts off reflections at night from the motorman's window

keep passengers off the front platform. The stanchions serve as guides for a curtain to cut off reflections on the motorman's window at night; they also serve as grab handles. The interior finish is of cherry and the ceilings of 3/16-in. Galco board, painted Nile green and decorated. Push buttons are located on the side posts out of reach of children. The folding gates, platform gongs, signal bells, sand boxes, brake handles



CARS FOR ROCHESTER & MANITOU RAILWAY. Cross section of bottom framing at crossing and other Brill patented specialties are included in the equipment. The cars are built on steel underframes, which are made of 24 by ¼-in. steel sill plates; end sills, 9-in. 13.25-lb. channels; diagonal braces, 3 by ¼-in. steel plate; and crossings of 4-in channels securely gusseted to the side sills. The body framing consists of white ash corner posts, 2¾ in. thick, and side posts of the same, 2¼ in. thick.

Length over corner posts	36 ft. 10½ in.	Step to platform	14½ in.
Length over platforms	46 ft. 3½ in.	Platform to floor	9 in.
Length of platforms	4 ft. 8½ in.	Seating capacity	52
Centers of side posts	2 ft. 8 in.	Type of trucks	Brill No. 27-G1
Width over sides	8 ft. 5 in.	Wheel base	4 ft. 6 in.
Extreme width	8 ft. 8 in.	Diameter of wheels	33 in.
From track to side sills	2 ft. 9⅞ in.	Type of motors	GE-90—4
From side sills over trolley boards	9 ft. 2 in.	Weight of car body less electrical equipment	19,060 lb.
From floor to center of headlining	8 ft. 2½ in.	Weight of trucks	11,700 lb.
Track to step	16½ in.	Total weight	30,760 lb.

* * *

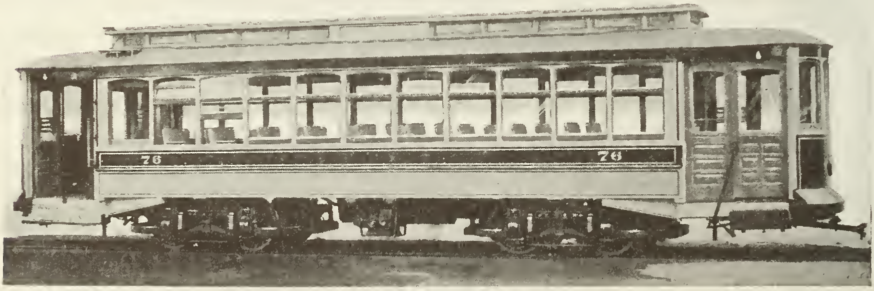
ADDITIONAL P-A-Y-E CARS FOR LYNCHBURG, VA.

BRILL SEMI-CONVERTIBLE TYPE

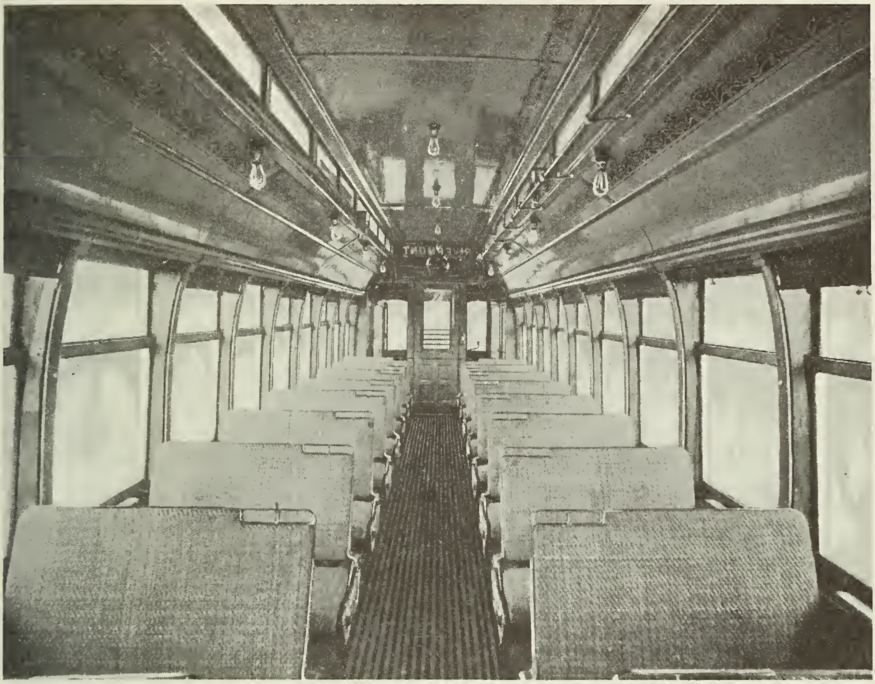
SIX pay-as-you-enter cars of the railway company's standard type and similar to those described in the June, 1910, issue of BRILL MAGAZINE, were delivered recently to the Lynchburg Traction & Light Company by The J. G. Brill Company. This road, which is controlled by the American Railways Company of Philadelphia, operates all of the street railway lines in Lynchburg. The cars on a section of the lines, extending two miles from the center of the city to Rivermont Park, a popular resort owned by the railway company, were hardly sufficient to handle the crowds last season, and therefore the new cars have been placed on this lin

The cars have 6 ft. 2½-in. platforms, divided into passageways for entering and leaving passengers by stationary railings equipped with fare boxes. Each end of the carbody has single sliding doors for entrance and exit, with pocket for both in a center bulkhead; the exit door is operated by a lever from the conductor's position. A two-leaf vestibule door, folding against the controller, closes the entrance-exit side of the platform; on the edge of the platform at the center is a pipe stanchion, against which this two-leaf door is securely held by a bar which, when pulled down behind the door, operates the long folding step. On the opposite side of the platform, the exit door slides on the outside of the vestibule paneling. The door and its step are opened and closed by a lever operated by the motorman. The sashes above the vestibule side panels and those in the sliding vestibule doors are removable, and screens, substantially reinforced with angle irons, are provided for summer use.

The cars are furnished with Brill "Winner" seats, 36 in. wide and having 18-in. backs; the longitudinal corner seats next the body exit doors are made in two sections, seating one passenger each, the section nearest the door being arranged to fold up; the corner seat opposite accommodates one passenger. The interiors are finished in ash, with 3-ply birch veneer for



CARS FOR LYNCHBURG TRACTION & LIGHT CO. Entrance side of platforms has two-leaf folding door securely held, when closed, against center stanchion by drop-bar which also operates step. Mounted on Brill No. 27-G1 trucks



CARS FOR LYNCHBURG TRACTION & LIGHT CO. Single doors in body ends slide into center bulkhead. Exit door is operated by lever from conductor's position

the headlinings. Push buttons are provided on the side posts and on the rear platform for the conductor. The Brill semi-convertible window system is standard on the Lynchburg cars. The brake handles, signal bells, bumpers, drawbars, platform gongs, etc., are of the Brill patented type, and the cars are mounted on Brill No. 27-GE1 trucks. The bottom framing consists of long-leaf yellow pine side sills, 4 by 7¾ in., reinforced with 15 by ⅜-in. steel plates; oak end sills, 5¼ by 6⅞ in., and oak crossings, 4½ by 5½ in. The body framing is of straight-grained ash, with corner posts 3⅝ in. thick and the side posts 2¾ in.; sweep of posts, 1¾ in.

Length over corner posts	30 ft. 8 in.	Track to step	17 in.
Length over platforms	43 ft. 1 in.	Step to platform	14½ in.
Length of platforms	6 ft. 2½ in.	Platform to floor	8⅛ in.
Centers of side posts	2 ft. 8 in.	Seating capacity	42
Width over sills	7 ft. 11¼ in.	Type of trucks	Brill No. 27-GE1
From track to side sills	2 ft. 8¾ in.	Wheel base	4 ft. 6 in.

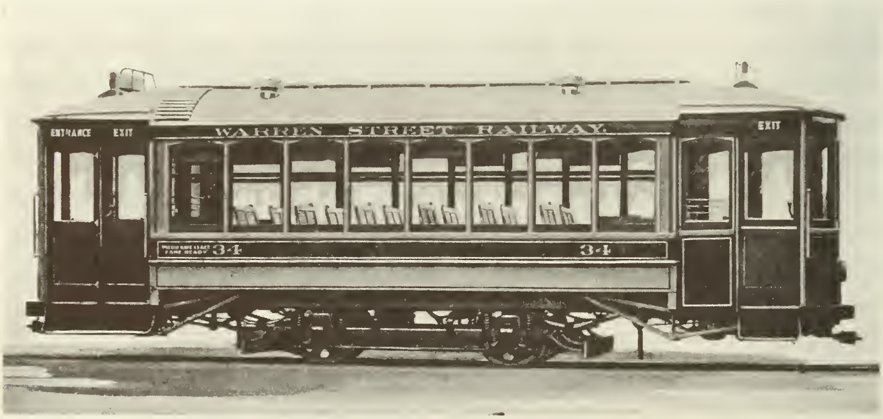
Diameter of wheels	33 in.	Weight of elec. equipment	1,500 lb.
Size of journal	3¾ in.	Weight of air brake equip.	1,500 lb.
Type of motors	GE-80—4-40 h.p.	Weight of trucks	12,000 lb.
Weight of carbody, less electrical equipment	19,000 lb.	Weight of motors	11,200 lb.
		Total weight	45,200 lb.

SEMI-CONVERTIBLE CARS FOR WARREN, PA.

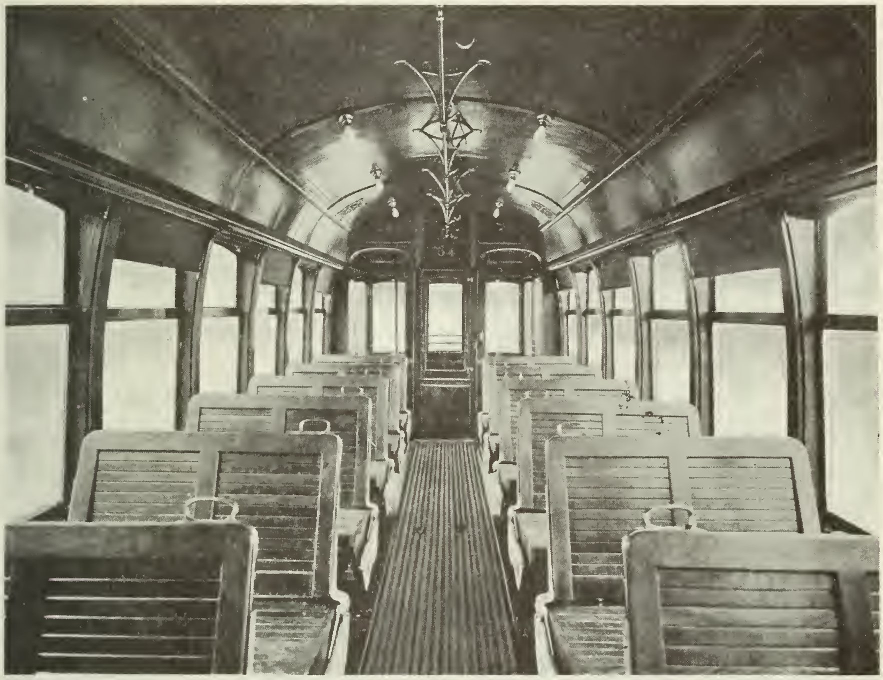
BRILL PLAIN ARCH ROOF

A FEW weeks ago the G. C. Kuhlman Car Company shipped five single-truck, pay-as-you-enter cars of the Brill semi-convertible type to the Warren Street Railway, of Warren, Pa. Both the single-truck and the double-truck cars of the Warren lines have been of the Brill semi-convertible type for many years. The new cars are in operation on the main line of the city system on a 10-minute schedule, and are also used on the Conewago Avenue line and the line to North Warren.

The car bodies are of the standard construction and dimensions used with this type of window system, and are built on



CARS FOR WARREN. Platforms are alike at each end and have standard pay-as-you-enter railing. Cars are mounted on Brill No. 21-E trucks



Cars for Warren. The Brill semi-convertible window system is standard in cars of the Warren Street Railway

wooden underframes with the side sills reinforced by 9 by ⅝-in. steel sill plates and the platforms supported on channel steel open-truss knees. There are six transverse seats on each side of the aisle of the Brill "Winner" type made of cherry slats. The seats are 35 in. over the end plates and, as they are brought between the posts and against the side lining, the aisle is enabled to be 22 in. wide. Near the entrance at each end of the carbody is a longitudinal seat for one person, and opposite is a double longitudinal seat at each end near the exit door. This double seat has a hinged section next the door, which allows it to fold up out of the way.

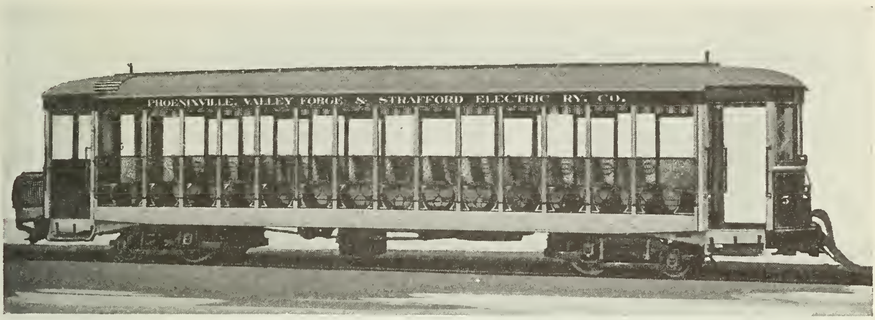
The platforms are alike at each end and have the regular form of pay-as-you-enter railing extending from a pipe stanchion at the center of the step around the panel of the bulkhead. A fare box is used, into which passengers are required to deposit the fare, with the exception of transfers. The vestibule doors at the entrance side are made in two sections arranged to fold against the controller. The vestibule door at the opposite side of the platform is of the single sliding type, operated by a pedal. The body entrance and exit doors slide into a central bulkhead, the exit door being controlled by a lever on the outside of the bulkhead convenient to the conductor's position.

Length over corner posts	20 ft. 8 in.	From floor to center of headlining	7 ft. 6 in.
Length over platforms	32 ft. 4 in.	From track to step	15⅛ in.
Length of platforms	5 ft. 10 in.	From step to platform	14 in.
Centers of side posts	2 ft. 5 in.	From platform to floor	$8\frac{15}{16}$ in.
Width over sills	7 ft. 9½ in.	Seating capacity	30
Width over posts	8 ft. 0 in.	Type of truck	Brill No. 21-E
Extreme width	8 ft. 3 in.	Weight of car body, less electrical equipment	15,360 lb.
From track to side sills	2 ft. $11\frac{1}{16}$ in.	Weight of truck	5,480 lb.
From side sills over trolley boards	8 ft. 3¾ in.		

EXCURSION CARS FOR NEW LINE NEAR PHILADELPHIA

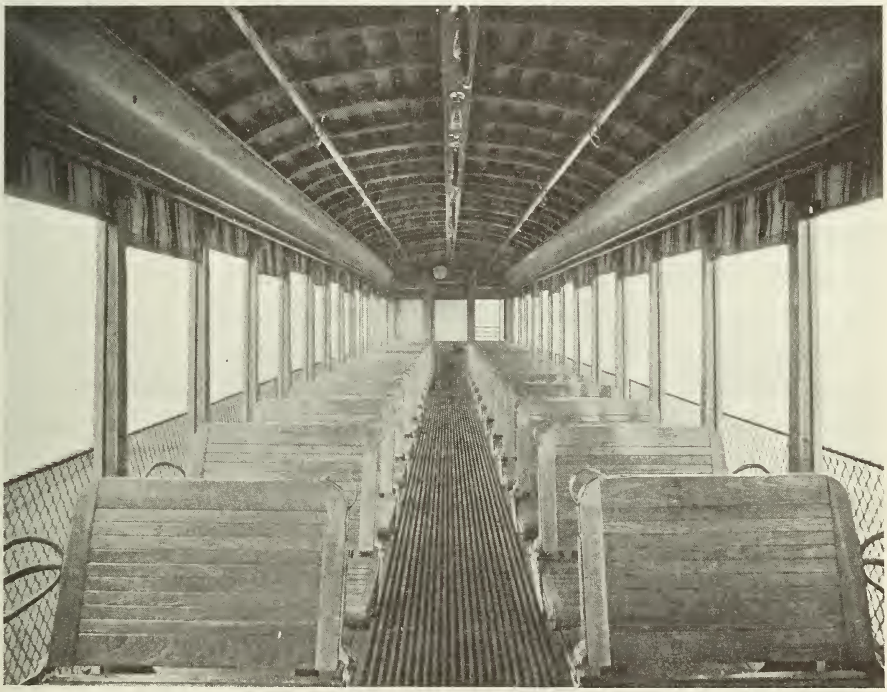
BRILL No. 39-E TRUCKS

THE Phœnixville, Valley Forge & Strafford Electric Railway Company is a new line which commenced operation a few weeks ago with cars of the type illustrated, built by The J. G. Brill Company. The northern terminus of the line is at Phœnixville, on the Schuylkill River, about 20 miles northwest of Philadelphia, and extends along the western bank of the river to Valley Forge, and then, at a right angle to the river, to Strafford, on the Main Line of the Pennsylvania Railroad. The country traversed is noted for its beautiful scenery, and, together with Valley Forge, where there is a national park in which is the house used by Washing-



CARS FOR PHŒNIXVILLE. These 60-passenger cars were delivered early this season. They are mounted on Brill No. 39-E single-motor trucks

ton as headquarters during the Revolutionary War, attract large numbers of excursionists during the summer season to this vicinity, and trolley service has long been needed to furnish adequate transportation. The new cars are admirably adapted



CARS FOR PHŒNIXVILLE. Heavy duck curtains completely enclose the sides, including the platform entrances when needed. The vestibule sashes drop into pockets to this kind of excursion service and also to the regular traffic between the Main Line and Phœnixville, which promises to be large. The line connects several trolley systems in this part of the state.

The cars are built on wooden underframes, substantially reinforced with 12 by ⅝-in. sill plates and undertrusses. The corner posts are 3⅝ in. and side posts 2¾ in. The Brill Plain Arch roof is reinforced by the usual steel carlines. The platform hoods are detachable. The interior finish is of ash, with "Winner" type of seats of the same. Heavy duck curtains are provided at the platform entrances, as well as the sides of the car, and all can be drawn completely to the floor. Sashes in the vestibules are arranged to drop.

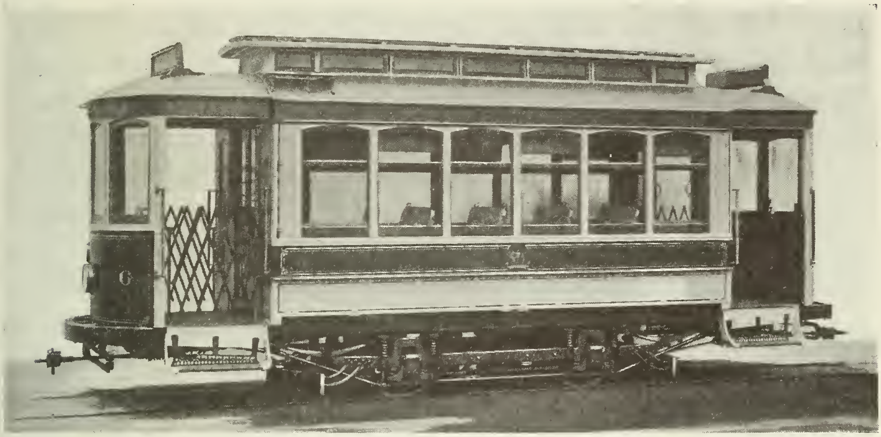
Length over corner posts	36 ft. 5 in.
Length over platforms	45 ft. 10 in.
Length of platforms	4 ft. 8½ in.
Centers of side posts	2 ft. 5 in.
Width over sills	8 ft. 2¼ in.
Extreme width	8 ft. 2 in.
From track to side sills	2 ft. 7⅝ in.
From track to step	15¾ in.
From step to platform	14½ in.
From platform to floor	8⅛ in.
Seating capacity	60
Type of trucks	Brill No. 39-E

Wheel base	4 ft. 6 in.
Diameter of wheels	21 in. and 33 in.
Size of journal	3¾ by 7 in.
Type of motors	West. 306—2-50 h.p.
Weight of car body less elec. equipment	16,000 lb.
Wt. of electrical equipment	1,250 lb.
Wt. of air brake equipment	1,120 lb.
Wt. of trucks	10.280 lb.
Wt. of motors	5,750 lb.
Total weight	34,400 lb.

SHORT SEMI-CONVERTIBLE CARS FOR COIMBRA, PORTUGAL

BRILL No. 21E TRUCKS

A NUMBER of single-truck cars, one of which is illustrated, have just been shipped to the Coimbra Tramways Company by the J. G. Brill Company. Coimbra is in the central part of Portugal, on the River Mondego, 115 miles north of Lisbon, on the Lisbon-Oporto Railway. It has a



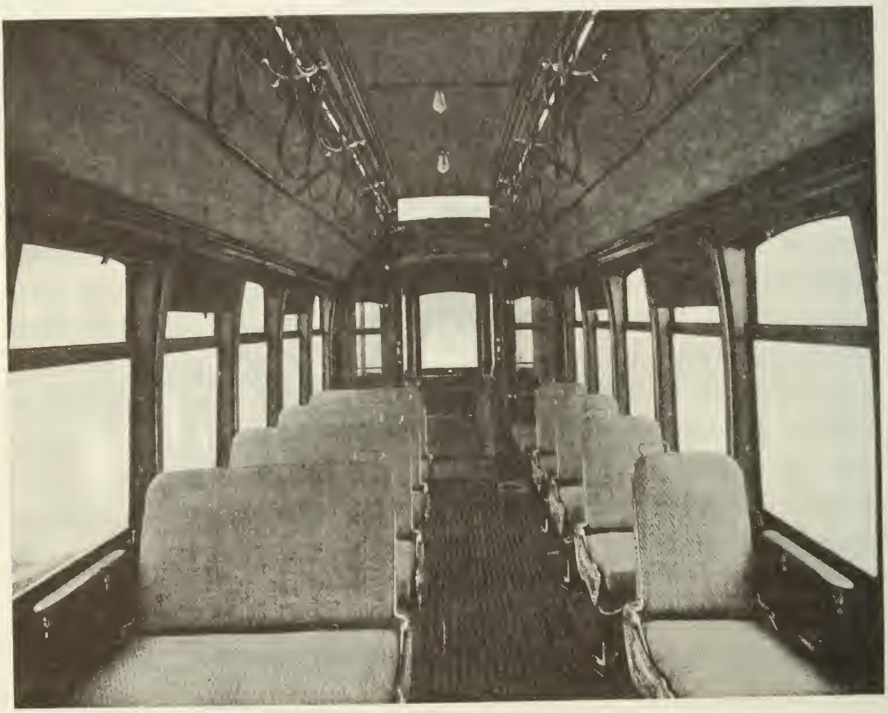
Cars for Coimbra. The cars have 16-ft. bodies and 4-ft. 8½-in. platforms. Mounted on Brill No. 21-E trucks with 6-ft. 6-in. wheel base

population of about 25,000 and is the site of a great university of ancient foundation. The city has a number of other educational establishments, including a military college. The river is only navigable in flood, so that the trade of the city is mainly local; but there are important lamprey fisheries and pottery, leather and hat industries.

It is seldom that single-truck closed cars of the Brill semi-convertible type are built with shorter bodies than 20 ft. 8 in., but, as the traffic of the Coimbra Tramways is comparatively light and there are a number of steep grades, and also because some of the streets traversed by the lines are narrow, these short, light and narrow units are better suited to the requirements of the city. Except for the smaller dimensions than usual and the single transverse seats on one side of the aisle, the cars are of standard construction and have the Brill standard type of semi-convertible window system. The bottom framing is built of 3¾ by 6⅝-in. yellow pine side sills; 4¼ by 7-in. yellow pine truck sub-sills and 7 by 3½ by ½-in. truck sub-sill angles; 3½ by 6⅝-in. oak end sills, and 3½ by 5¾-in. oak crossings. The corner posts are of ash, 5⅝ in., and side posts of the same, 2¾ in. thick; sweep of posts 1¾ in. Cherry constitutes the interior finish, with ceilings of

3-ply birch veneer. The seats are of the Brill "Winner" type; those for two passengers are 35 in. over the end plates and the single seats are 18 in. over the end plates. The width of the cars over the posts is 6 ft. 11½ in.; therefore, with 35-in. and 18-in. seats and 2 in. for thickness of walls, the aisle is left 26½ in. clear between the end plates of seats. These figures show distinct advantage, especially in the narrow car, of using the Brill semi-convertible window system, which eliminates wall window pockets and permits the walls to be but 2 in. thick. There is air space between the outside panels and inside lining to prevent radiation of the heat of the car in winter.

The folding gates, which enclose the platforms at both sides, platform steps, angle iron bumpers, radial drawbars,



CARS FOR COIMBRA. The cars are furnished with 18-in. and 35-in. Brill "Winner" seats. Width of aisle, 26½ in. Seating capacity, 20 ratchet brake handles, "Dedenda" platform gongs, "Retriever" signal bells, "Dumpit" sand boxes, mutually sliding door mechanism, "Winner" seats, and twill woven cane for seats are all of Brill manufacture, and the cars are mounted on the Brill No. 21-E type of single-truck.

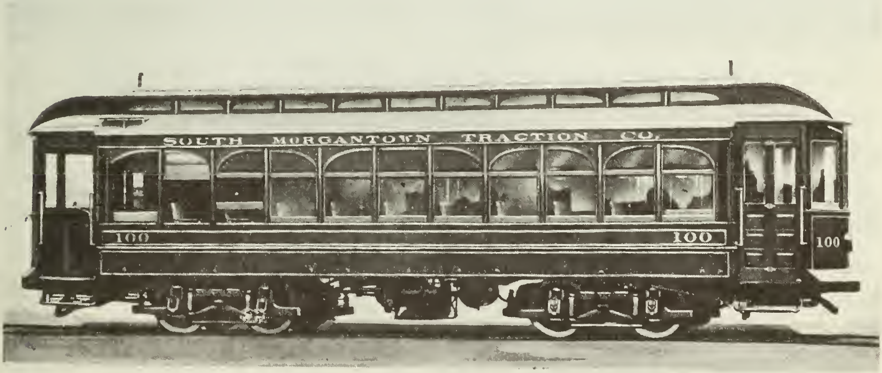
Length over corner posts	16 ft. 0 in.
Length over platforms	25 ft. 5 in.
Length of platforms	4 ft. 8½ in.
Centers of side posts	2 ft. 5 in.
Width over sills	6 ft. 9 in.
Extreme width	7 ft. 2⅝ in.
Track to side sills	2 ft. 2⅝ in.
Track to step	17¾ in.
Step to platform	14½ in.
Platform to floor	5¾ in.
Seating capacity	20
Type of trucks	Brill No. 21-E

Wheel base	6 ft. 6 in.
Diameter of wheels	33 in.
Size of journal	3½ in.
Type of motors	GE58—2-37 h. p.
Weight of carbody less electrical equipment	8,990 lb.
Weight of electrical equip.	940 lb.
Weight of trucks, including track brakes	6,300 lb.
Weight of motors	4,300 lb.
Total weight	20,530 lb.

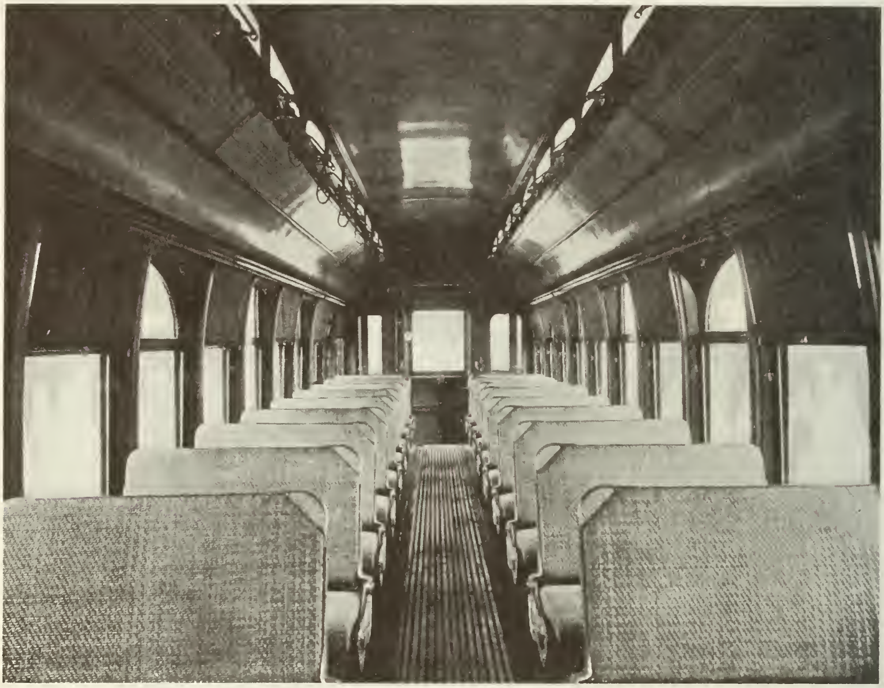
TWIN-WINDOW SEMI-CONVERTIBLE CARS

FOR MORGANTOWN, W. VA.

THE South Morgantown Traction Company received some time ago several handsome cars built by the G. C. Kuhlman Car Company. This railway system centers



Cars for South Morgantown Traction Co. The window system is the Brill standard semi-convertible type except that the upper sashes have the top rail arched in pairs. Cars are mounted on Brill No. 27-GE1 trucks at Morgantown, on the Monongahela River, close to the northern border of the state. The cars are built on the standard type of wooden underframe for this length of Brill semi-convertible car, including 15 by ⅜-in. steel plates on the insides of the sills, which is also standard construction. The windows are arranged in five and one-half pairs to each side: each pair of top sashes forms a half oval, and both sashes slide into roof pockets in the regular method of the Brill system, the lower sash automatically engaging the upper on being raised. The odd window is placed at the center, and the appearance, with the corresponding arch deck sashes of the "steam car" roof, is harmonious and attractive. The interiors are finished in cherry with doors and sashes of the same and ceilings of birch veneer. The double sliding doors at each



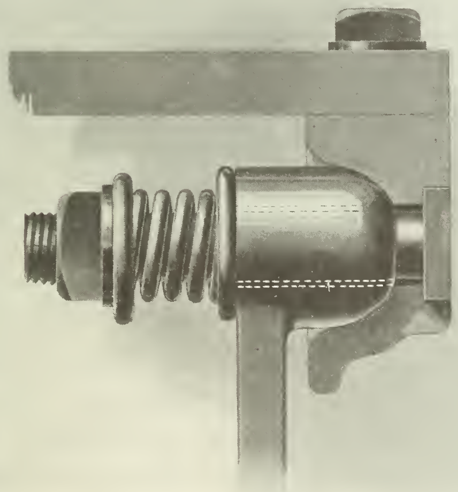
CARS FOR SOUTH MORGANTOWN TRACTION CO. The interiors are plainly but richly finished in cherry with ceilings of birch veneer. Seating capacity, 44 end have 40-in. opening. The Brill "Winner" seats are 36 in. long and have 18-in. backs. The aisle width is 22 in.

Length over corner posts	30 ft. 8 in.	From floor to center of head-lining	8 ft. 4½ in.
Length over platforms	40 ft. 8 in.	Step to platform	14½ in.
Length of platforms	4 ft. 8½ ih.	Platform to floor	9 in.
Centers of side posts	2 ft. 8 in.	Seating capacity	44
Width ovea sills	7 ft. 11½ in.	Type of trucks	Brill No. 27-GE1
Width over posts	8 ft. 2 in.	Wheel base	4 ft. 6 in.
Extreme width	8 ft. 5 in.	Diameter of wheels	33 in.
From track to side sills	2 ft. 8⅝ in.	Total weight — carbody, trucks and motors	48,300 lb.
From side sills over trolley boards	9 ft. 3⅝ in.		
Track to step	16 in.		

* * *

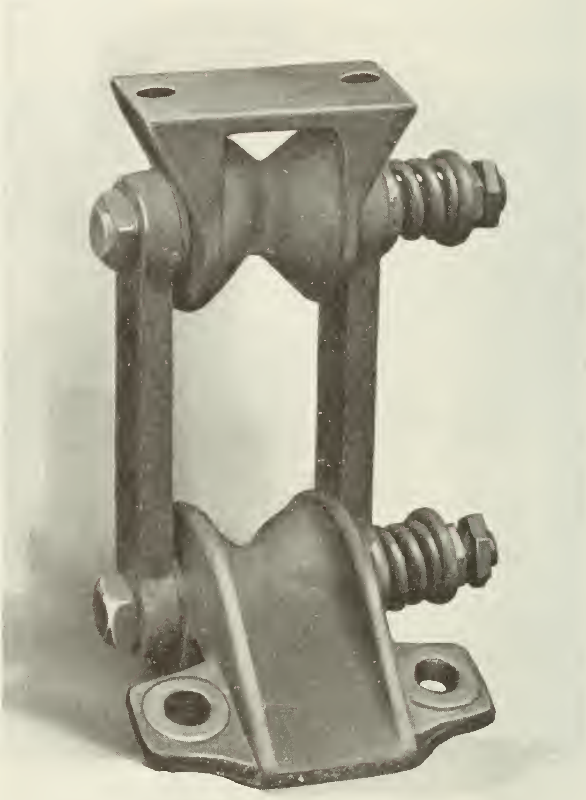
THE BRILL HALF-BALL BRAKE HANGER

THE Half-Ball Brake Hanger (patented) was introduced in March, 1908, and has been installed on nearly every Brill truck built since that time. Up to the present none have worn to an extent which has necessitated their being replaced, so their life has not as yet been determined. From reports secured from many railway companies, it would appear that the life of the malleable castings would average about five years, while the forged hangers have shown little, if any, wear and will last indefinitely; but to insure them



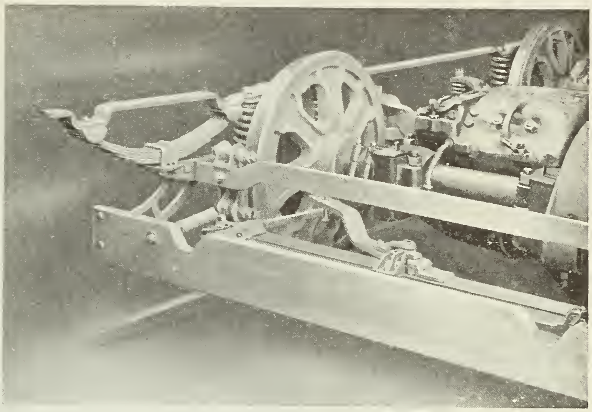
Half-Ball Brake Hanger. Half-section of socket casting showing the half-ball. Dotted lines indicate space around bolt for lateral play against ever wearing out, the wearing surfaces are now being case-hardened. Therefore, as the brake hanger is self-adjusting and self-cleaning, it needs no attention for a number of years; being self-adjusting, it is, of course, noiseless.

The use of the Half-ball Hanger has made it possible to place the upright levers of Brill trucks, in which the hangers are connected with the shoe heads, in a vertical position, the travel of the levers being directly between the hangers, and thereby eliminating the tendency to twist the shoes or crowd them off the wheel, such as is the case with other types of hangers where the levers are necessarily placed at an angle. This has very materially added to the life of the brake shoes, and has cut down maintenance charges to a considerable extent because of the less frequent adjustment of the brakes—a feature which appeals very strongly to master mechanics and persons having to do with the care of brakes.



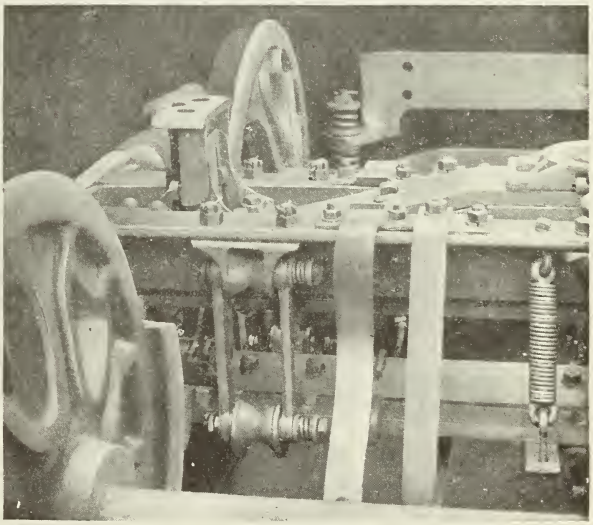
Half-Ball Brake Hanger. Standard form of attachment for trucks, having brake beams hung from transoms such as shown at bottom of opposite page

The lateral flexibility of the Half-Ball Brake Hanger, which allows the brake rigging to remain in a free position

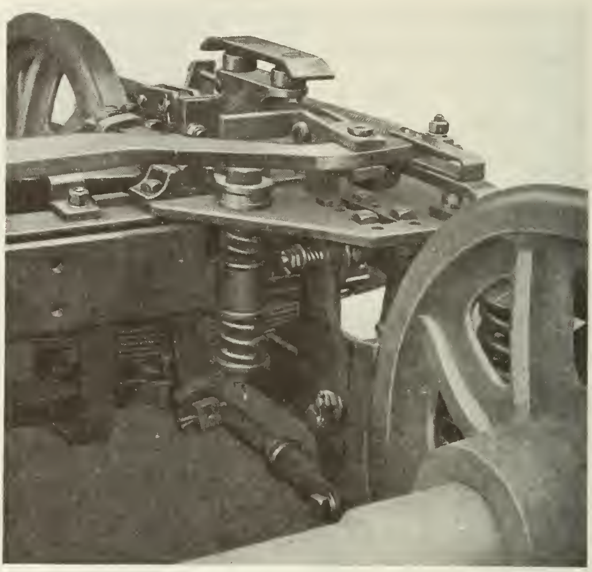


Half-Ball Brake Hanger. No. 21-E truck. Upper socket casting attached to end frame: lower parts of Hanger attached to shoe head

in relation to the wheels while the axle box frame moves laterally over the axles when the car is rounding curves, eliminates the friction between the brake shoes and the flanges of the wheels, and relieves the frame of strains produced by side twisting of shoes hung in a rigid position. Lateral flexibility is especially important in regard to the free rolling of the wheels over irregular portions of the track or while rounding curves, and, where a number of curves are encountered, results in a very considerable saving of current. It has been found that trucks with Brill Half-Ball Brake Hangers will coast around curves with current cut off, while trucks with brake hangers having no lateral flexibility, and consequently more or less friction between shoes and wheel flanges, require the controller handle to be on the third



Half-Ball Brake Hanger. No. 27-G truck. The Hanger as used on this truck is shown on opposite page point to get around curves.



HALF-BALL BRAKE HANGER. No. 27-M.C.B. truck. Upper socket castings are bolted to transom gusset plate; lower parts of hanger attached to shoe head. Note the vertical position of the upright lever

Summing up the advantages of the Half-Ball Brake Hanger, they are found to be self-adjusting, noiseless and self-cleaning; the socket castings have an average life of five years; the forged hangers never wear out; upright levers, attached to the shoe heads, can be placed in a vertical position; lateral flexibility reduces current consumption by eliminating friction between the shoes and flanges and relieves the truck frame of strains. Except the case-hardening of the forged hangers, which has been undertaken simply as a precautionary measure, no changes have been made in the Half-Ball Hanger, although it had been subjected for four years to the most critical attention of many of the ablest master mechanics throughout the country, as well as of our own engineers, and it stands today the only brake hanger of its class that has won an important place in electric railway service.

THE J. G. BRILL COMPANY

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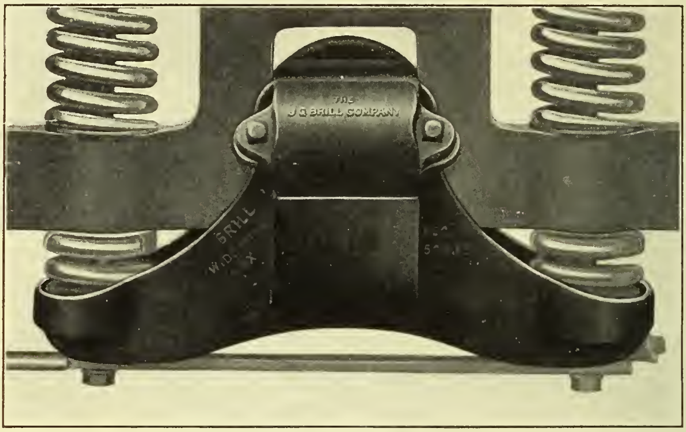

IMPROVEMENT IN BRILL No. 21-E TRUCK

All No. 21-E Single Trucks are now equipped with the Brill Wide Wing Journal Box which has two important advantages over the short wing journal box used heretofore. The first advantage is that greater stability in riding is produced by increasing the spring base of the truck frame. The length of the spring base of the frame of the Brill No. 21-E Truck equipped with the Brill Wide Wing Journal Box is 7½ inches greater than with the former box and 20 inches greater than trucks having the journal springs on top of the box. The second advantage is in reducing the stress on the truck frame by supporting the frame directly under the body coil springs. The Brill Wide Wing Journal Box is made of malleable iron and is furnished for all sizes of journals. See advertisement on the inside front cover.

THE J. G. BRILL COMPANY

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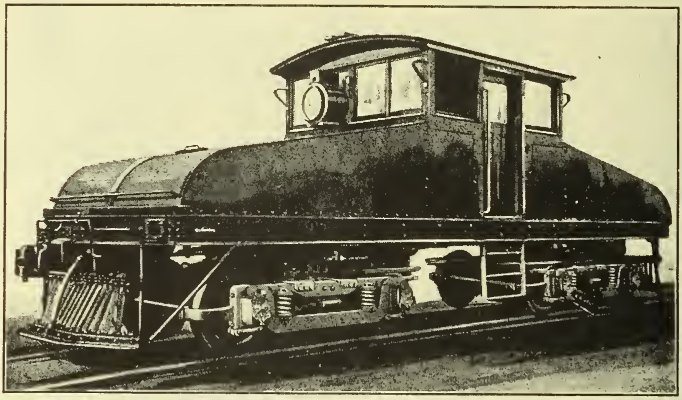
Vol. VI. JULY, 1912 No. 7

BRILL MAGAZINE

Westminster Street
Providence, R.I.



HEAVY ELECTRIC LOCOMOTIVES

The locomotive shown is of the design adopted by a number of the largest interurban systems, on account of the unobstructed view in every direction which the operator has from the centrally located cab and the ample space provided for loading the car to obtain the necessary traction for heavy trains. It is built on an all-steel frame, and the sides and covers at both ends are steel. The rapidly increasing number of interurban lines connecting with steam roads for the handling of freight traffic is making a considerable demand for locomotives fitted with steam car couplers and powerful enough to switch and draw a train of freight cars.

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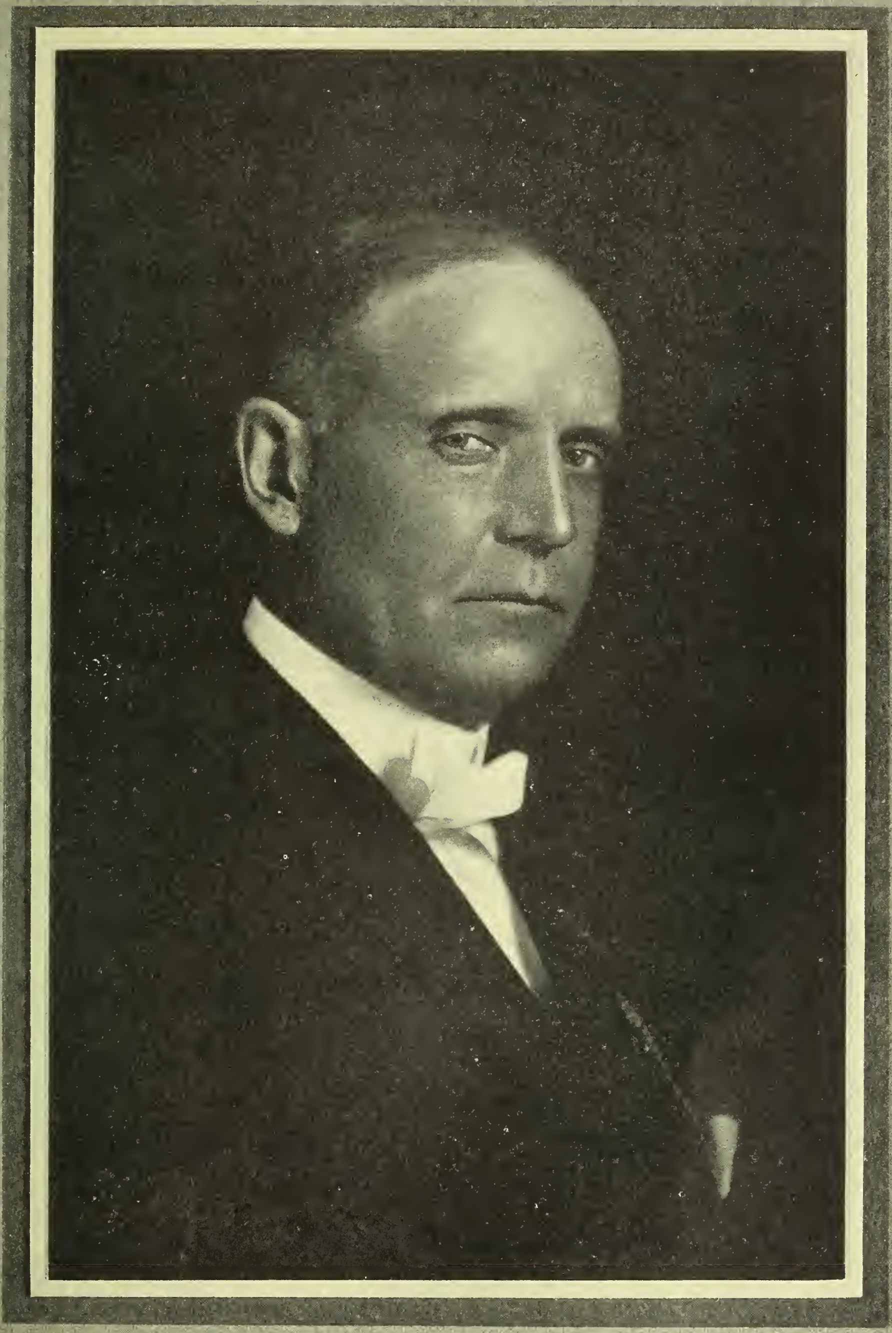

B. S. Josselyn

PRESIDENT, PORTLAND RAILWAY, LIGHT & POWER COMPANY

LEMENT TO BRILL MAGAZINE
JULY, 1912

BRILL MAGAZINE

Vol. VI JULY, 1912 No. 7

B. S. JOSSELYN

[WITH PORTRAIT INSERT]

BENAGE S. JOSSELYN, president of the Portland Railway, Light & Power Company, of Portland, Oregon, was born at Heyworth, Illinois, February 7th, 1858. He left school at the age of 14 and entered railroad service as a ticket clerk, advancing through a number of positions during the following years, and in 1893 was appointed general manager of the Kansas City, Osceola & Southern Railway. In 1898 he became general superintendent of the Omaha & St. Louis and the Omaha, Kansas City & Eastern lines, leaving the next year to make reports on various railroads for eastern capitalists. From 1900 to 1902 he was manager of the Kentucky & Indiana Bridge & Railway Company with offices at Louisville; 1902-3 he was at Glens Falls, New York, as general manager of the Hudson Valley Railway Company; 1903-6, general manager, and in the latter year vice-president, of The Union Terminal Railway Company, Sioux City, Iowa; 1906-7, vice-president and general manager of the Maryland Telephone & Telegraph Company and Baltimore Electric Power Company. July 1st, 1907, Mr. Josselyn was elected president of the Portland Railway, Light & Power Company, Portland General Electric Company, Portland Railway Company, Oregon Water Power & Railroad Company, Union Traction Company, Portland & Sandy River Electric Company, Willamette Falls Company, Cazadero Real Estate Company, and Kenton Construction Company.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

PROVIDENCE, R. I.*

PROVIDENCE, the capital of Rhode Island, is one of the busiest and most progressive cities in the New England States and ranks next to Boston in population and wealth. The population in 1910 was 224,326. The city is situated at the head of the Providence River, which is a north arm of Narragansett Bay, and is 35 miles from the Atlantic Ocean, 45 miles by rail from Boston, and 188 miles from New York. Providence is served by the New York, New Haven & Hartford Railroad and by steamboat lines to Newport, New York, Philadelphia, Baltimore and Norfolk. It has an area of over 18 square miles, the western part being level and gently rolling and but a few feet above the sea, and the eastern part a hilly plateau rising to a maximum height

PROVIDENCE TRAFFIC CONDITIONS AND CARS. Northwestern section of the city, with Exchange Place in foreground and Union Station at the right. The Rhode Island Company's office building is at the end of the station. Exchange Place will probably be the most important terminal point of the system in the future

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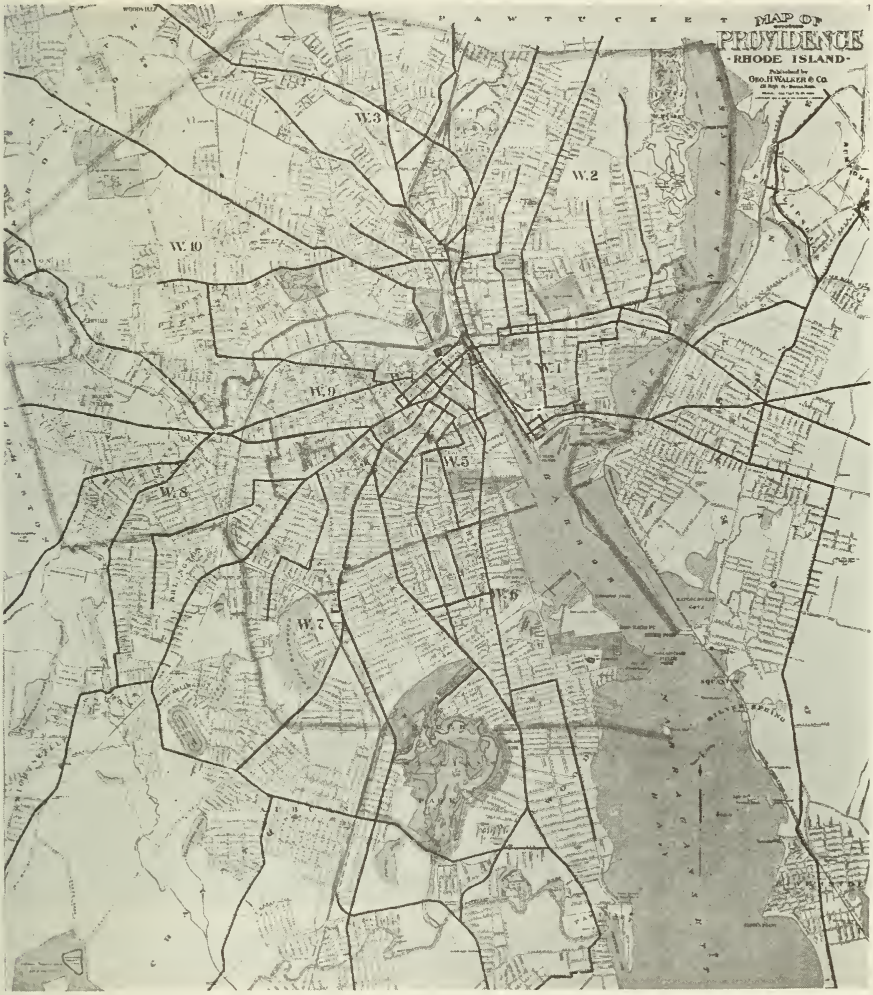
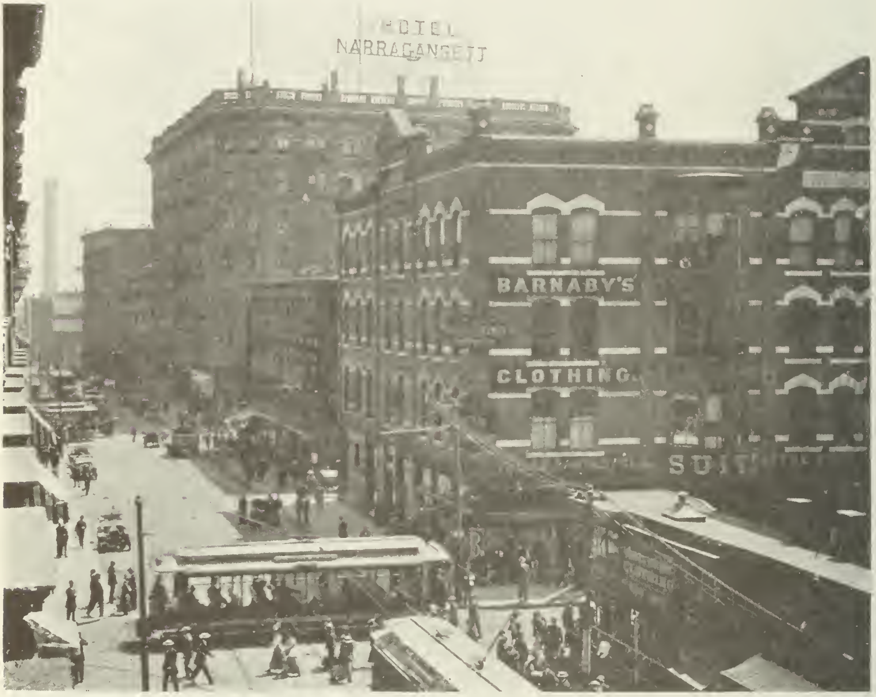
*This is the forty-third article of this series.



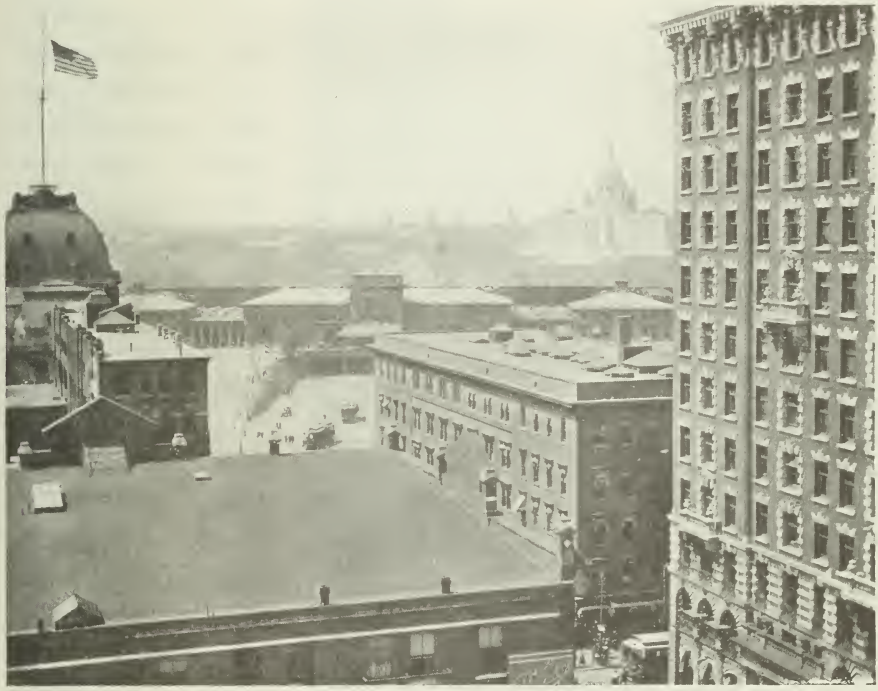
Providence Traffic Conditions and Cars. Map of the Providence lines of The Rhode Island Company

of about 200 feet. It has many large and handsome public and business buildings and is the site of Brown University, one of the oldest colleges in the United States. There are 33 public parks, with a total area of 644½ acres, and 9 metropolitan reservations, containing 677 acres, the finest of which is Roger Williams Park in the southern part of the city. The principal manufactures are jewelry, worsted goods, the reducing and refining of gold and silver sweepings, silversmithing and the manufacture of silverware, foundry and machine shop products, woolen and cotton goods, rubber and elastic goods, and malt liquors.

The Rhode Island Company owns or controls all the electric railway lines in Providence and vicinity, including Pawtucket, several miles beyond the northern border, with a population of over 50,000, and Woonsocket, 20 miles north, with a population of 40,000. The population of the 5-cent fare zone, which is larger than the limits of Providence, is 286,000; the entire district tributary to the company's lines has a population of 465,000. Within the 5-cent fare zone there are 170 miles of track, 36 miles of which are double

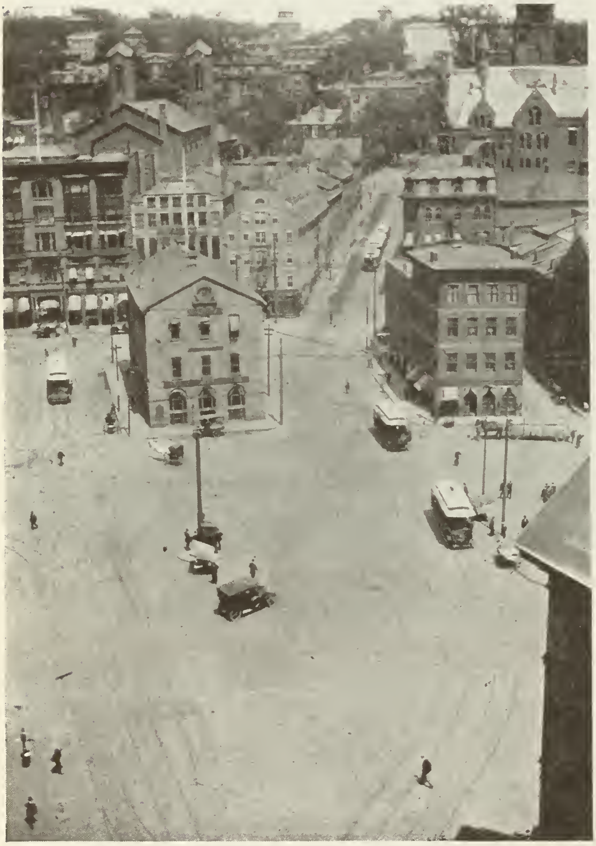


Providence Traffic Conditions and Cars. Dorrance Street at the intersection of Westminster. The worst congestion on the system occurs at this point. Photograph on next page was made from roof of Hotel Narragansett looking in opposite direction tracks; the entire system has a trackage of 380 miles, 46 miles of which are double tracks. The radial form of the city's development has produced a corresponding layout of the lines, centering within a few blocks in the retail district, where the streets are narrow. The lines have their terminals at Market Square, or at Dorrance and Westminster Streets, these points being less than 300 yards apart. The principal business thoroughfares are Westminster and Weybosset Streets, which form a bow about half a mile long, with Westminster Street as the connecting link. Westminster Street is narrow and has but one track, on which outward-bound cars are operated, the incoming cars using Washington Street, which is parallel to and but one block from Westminster

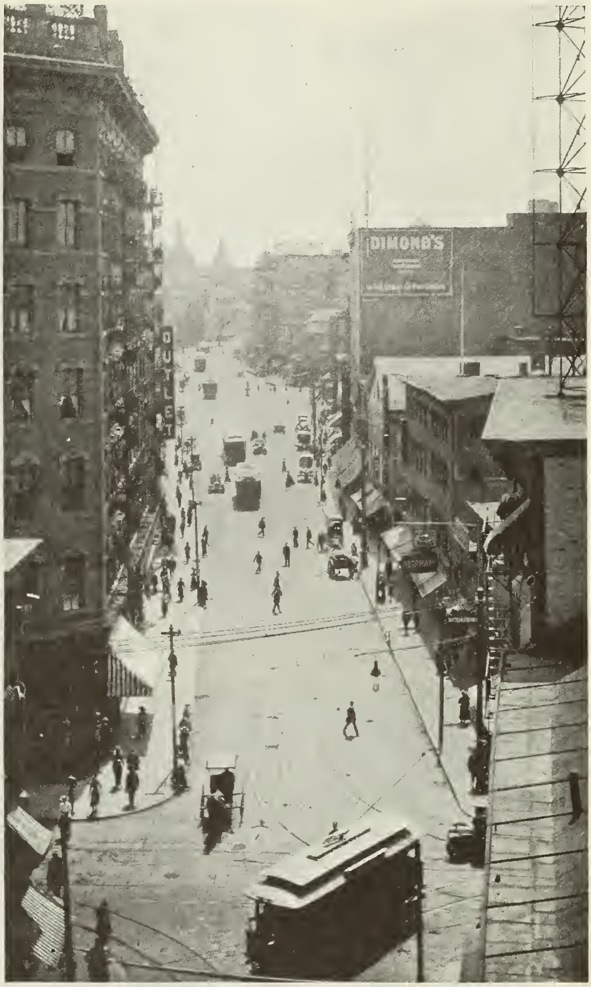


PROVIDENCE TRAFFIC CONDITIONS AND CARS. Crossing of Westminster and Dorrance Streets in the foreground; City Hall at left; New York, New Haven & Hartford Railroad Union Station in middle distance and Rhode Island State Capitol beyond

Street. There are no belt lines within the municipal boundaries and practically all of the travel comes in and goes out of the central district. All outbound cars from this district must pass through 9 outlets, and about 15,000 passengers leave this district between 5.30 and 6.30, divided almost equally between each outlet. The rush-hour service calls for more than double the equipment used in normal operation, and a considerable addition to the equipment is necessary at midday. While the principal factor of traffic congestion is the narrow streets in the central district, the municipal regulation of speed to 6 miles per hour in this district and 9 to 12 miles per hour elsewhere, together with the short intervals between stopping points — approximately 250 feet — hampers operation to an extent which causes a great inconvenience to the traveling public by preventing the use of sufficient equipment and necessitating slow schedules. Congestion is further produced by regula-



PROVIDENCE TRAFFIC CONDITIONS AND CARS. Market Square, the principal terminal of the system. College Hill, in background, is the finest residence section and location of Brown University. Two electric cars at a time are pushed up the hill or brought down by cable grip cars as shown. Photograph on cover was made from building at left



Providence Traffic Conditions and Cars. Looking west on Weybosset Street and showing Dorrance Street crossing. This important crossing is also shown in the middle distance of photograph on page 196

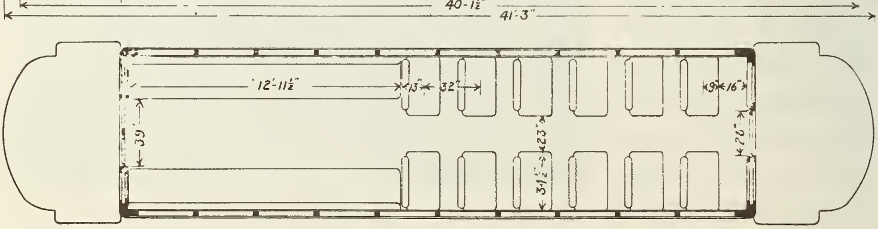
tions which prevent more than one car stopping and loading at the same corner, and also by permitting vehicles of all kinds to use heavy railway-traffic streets durthe rush hour. The company has reduced the congestion in the central district by through-routing as many of the cars as possible and installing automatic signals and other methods of facilitating the movement of cars.

During the past winter The Rhode Island Company, in the 5-cent fare zone, used in normal operation an average of 152 cars and in rush-hour service an average of 353 cars. The summer equipment used at present averages 159 open cars in normal operation and 385 open cars in rush-hour service.

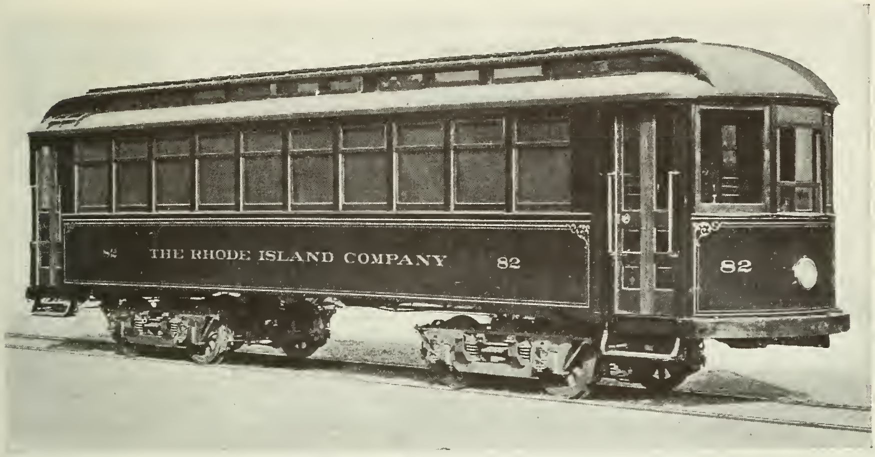
The standard closed car of the system is a substantially-built, handsomely-finished type, arranged for both single- and

PROVIDENCE TRAFFIC CONDITIONS AND CARS. Westminster Street at the center of the shopping district. Cars are restricted to a speed of 6 miles per hour in this district and stopping points are but 250 feet apart

double-end operation. The cars operated at one end have transverse seats in the forward part and longitudinal seats in the rear; the double-end cars have only longitudinal seats. The cars are built on wooden underframes, with side sills reinforced on the inside with sill plates. The upper window sashes are stationary and the lower are arranged to raise nearly their full height. Mahogany is used for the interior finish and for the sashes and doors.

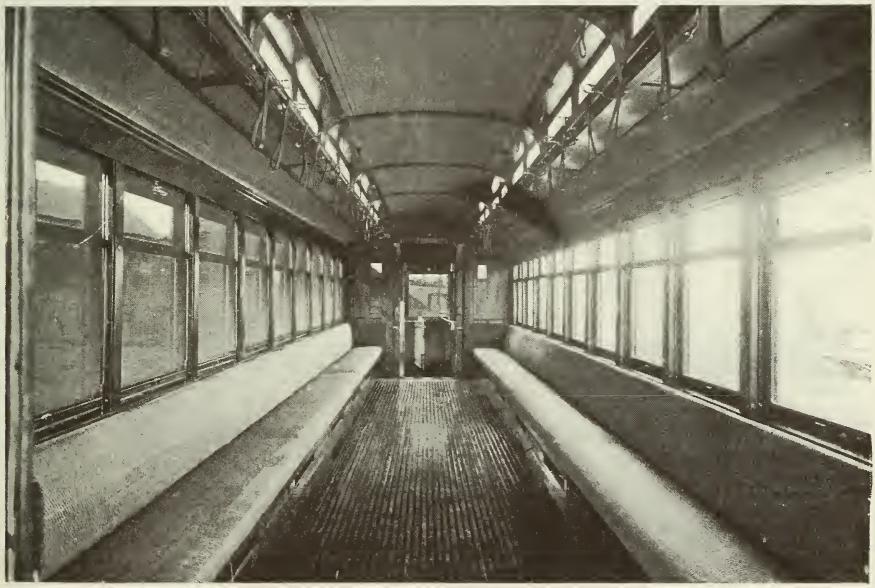


PROVIDENCE TRAFFIC CONDITIONS AND CARS. The type of car shown at the top of the opposite page is arranged for two classes of service: double-end operation and longitudinal seats for the heavy traffic lines, and single-end operation and transverse seats in forward part for the longer lines

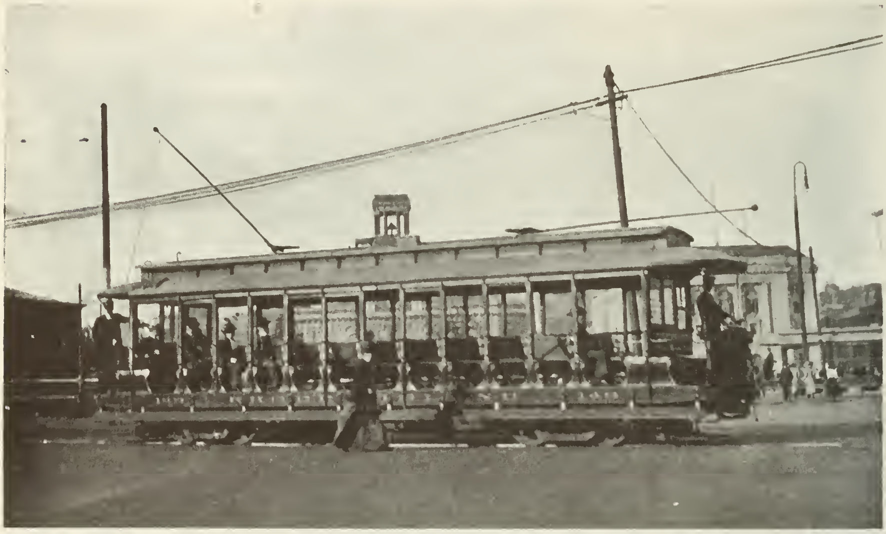


PROVIDENCE TRAFFIC CONDITIONS AND CARS. Standard closed car built by the Wason Manufacturing Company

Although a considerable number of single-truck open cars are in operation, the 15-bench double-truck car is the standard type for summer service and is particularly adapted to the requirements, as Providence is the center for a large amount



PROVIDENCE TRAFFIC CONDITIONS AND CARS. Interior of above car. This type of car is also furnished with transverse seats in forward part (see diagrams)



PROVIDENCE TRAFFIC CONDITIONS AND CARS. Standard 15-bench open car

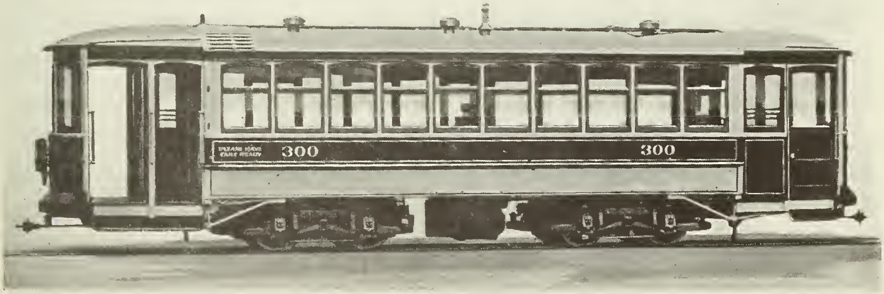
of excursion travel and pleasure riding to the popular resorts on either side of Narragansett Bay. The length of the cars over the bulkheads is 32 ft. 7½ in. and over the crown pieces, 40 ft. 6 in. Weight of a car and trucks with complete equipment, 41,850 lb.

INITIAL P-A-Y-E EQUIPMENT FOR PORTSMOUTH, OHIO

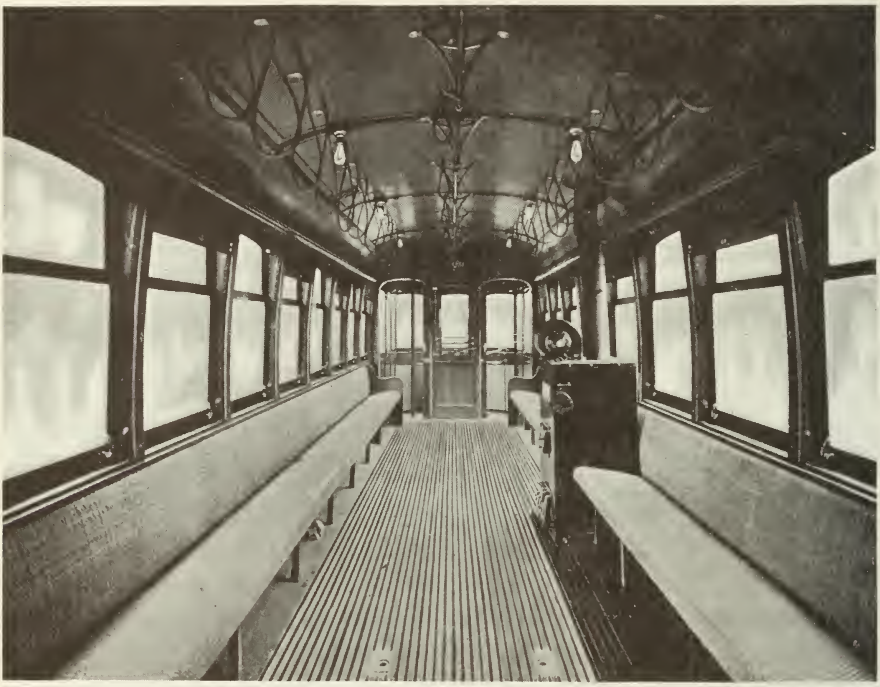
LONGITUDINAL-SEAT, SEMI-CONVERTIBLE TYPE

THE pay-as-you-enter method of fare collection was introduced in Portsmouth, Ohio, recently, on the receipt of a number of cars, of the type illustrated, from the G. C. Kuhlman Car Company. The cars are being used exclusively on the lines serving the business district and at present are reserved for the rush-hour traffic. While there are exits at both ends, passengers are requested to use the front exit as much as possible, to relieve the conductor of the double duty of watching the passengers entering and leaving. The company reports that the cars are giving entire satisfaction to the public and management. Portsmouth is a busy manufacturing city of 25,000 population, and is situated in the exact center of the southern border of the State, on the Ohio River. Portsmouth Street Railway & Light Company owns and operates the city lines and also controls the Ohio Valley Traction Company, which connects the city with Sciotoville, 12 miles to the northeast.

The particularly interesting features of these cars are, first, the use of longitudinal seats in a Brill semi-convertible type. While this is not a novel combination, as it is used in a number of cities, it is somewhat unusual. Within the last few months the G. C. Kuklman Car Company has furnished Brill semi-convertible cars with longitudinal seats to four different railway companies, one of which, the Chillicothe Electric Railway & Light Company, is described elsewhere in this issue. The saving of interior width, which is such an important feature of the Brill semi-convertible type, is, of course, lost when longitndinal seats are used; but the advantages of entirely clearing the window spaces of the sashes in warm weather, the storage of the sashes in roof pockets where there



Cars for Portsmouth. These cars have 28-ft. bodies and 6-ft. 8-in. platforms. Mounted on Brill No. 27-GE1 trucks



CARS FOR PORTSMOUTH. The combination of longitudinal seats and Brill semi-convertible windows is included in four different orders recently received by the G. C. Kuhlman Car Company

is no chance of breakage of glass, and the elimination of unsanitary wall pockets for the windows, all are distinctly valuable. Another interesting feature of these cars is the generous length of the platforms. The common length is 6 ft., but in these cars it is 7 ft. 2 in.—an important difference where most of the loading is at a few points. This additional length to the platforms is not wasteful of space, as, after the standing space in the body and front platform is occupied, the conductor may allow passengers to stand on the rear platform. The use of a wooden stanchion for the outside end of the pay-as-you-enter railing, which stanchion is about 15 in. from another wooden stanchion to which entrance and exit vestibule doors are hinged, is novel. It provides a passageway between the two stanchions and eliminates the necessity of having a drop section of railing to permit passengers to leave the enclosed space on the front platform, and this open space between the stanchions on the rear platform is covered by the vestibule doors while the passengers are entering or leaving. An exit door on each platform slides into a pocket and is operated by a lever.

The bottom framing is of composite construction, with long-leaf yellow pine side sills, 4 by 7¾ in., reinforced with 6 by 3½ by ⅜-in. angles on the inside of the sill, with the lower flange under the sill, and also a 15 by ⅜-in. steel plate inside of the angle. Inside trusses of 2½ by ⅜-in. section are supported on the posts 23 in. from the floor and anchored under the end sills to aid in preventing deflection of the sills by the long platforms. The center sills and the crossings are 3½ by $4\frac{7}{16}$ in.; the end sills are 5¼ by 6⅞ in., reinforced by a 6 by ½ in. plate bent around at the ends and bolted through the side sills. A ¾-in. tie rod is used just inside the end sill and alongside each crossing. The platforms are supported on channel steel outside knees of open truss form and inside knees of 4 by 3 by ½-in. angles, which extend 3 ft. 10 in. back of the bolster.

The finish of the interior of the cars and vestibules is of cherry, with ceilings of composition board. The roof is reinforced with nine steel carlines. The hoods are detachable.

The principal dimensions and weights of the cars are as follows:

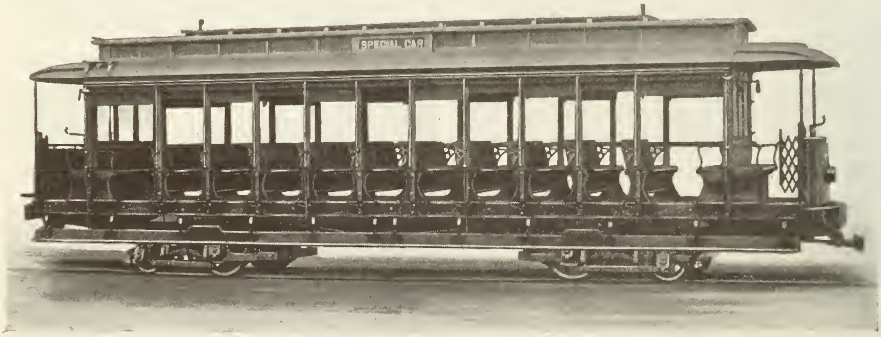
Length over corner posts	28 ft. 0 in.	From track to side sills	2 ft. 8⅝ in.
Length over platforms	42 ft. 4 in.	From track to step	15⅜ in.
Length of platforms	7 ft. 2 in.	From step to platform	14½ in.
Centers of side posts	2 ft. 8 in.	From platform to floor	9⅝ in.
Width over sills	8 ft. 0½ in.	Seating capacity	30
Width over posts	8 ft. 4 in.	Type of trucks	Brill No. 27-GE1
Extreme width	9 ft. 0 in.	Weight of carbody, air equipment and controllers	21,020 lb.
From side sills over trolley boards	8 ft. 11 in.	Weight of trucks and motors	23,880 lb.
From floor to center of headlining	7 ft. 10 in.	Total weight	44,900 lb.

FIFTY DOUBLE-TRUCK OPEN CARS FOR WASHINGTON, D. C.

BRILL "NARRAGANSETT" TYPE

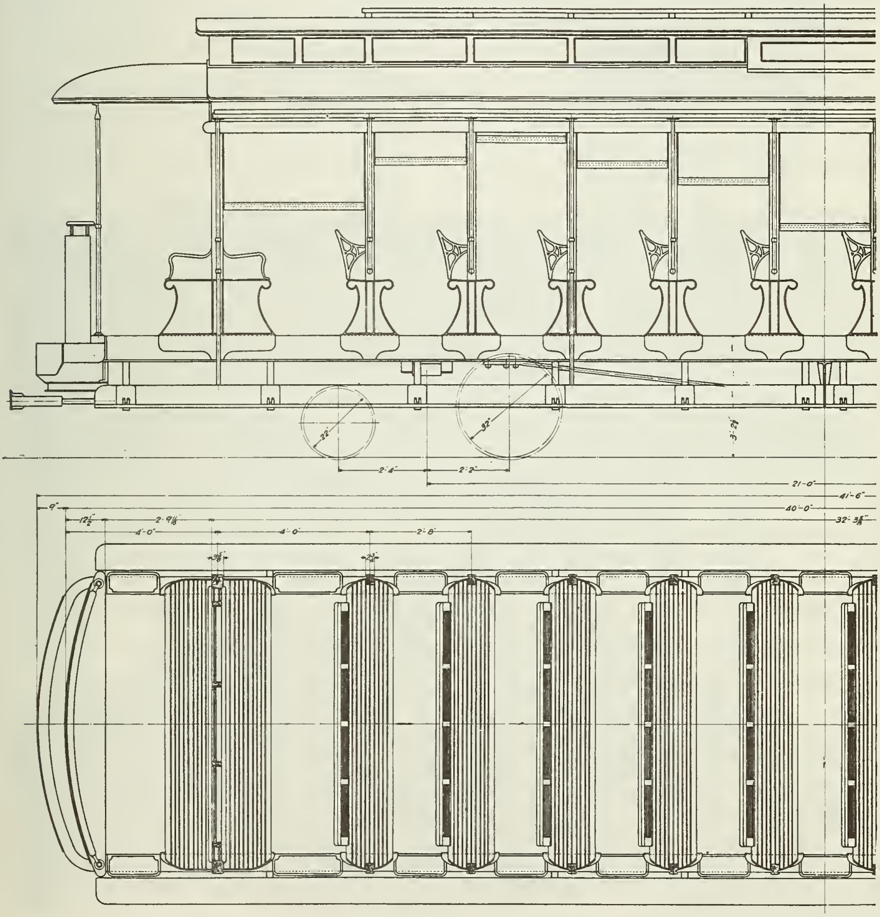
THE Washington Railway & Electric Company placed in operation this spring 50 open cars of the "Narragansett" type, mounted on Brill No. 39-E trucks, built by The J. G. Brill Company. The open car has always been a popular type in Washington, a fact which is very apparent from the large increase in receipts every spring when the cars are first put on the lines. The company ordered the "Narragansett" type of car because its step arrangement gives the safest and easiest entrance and exit. The cars will be used on the lines running from the Capitol, or the Treasury, out along the Potomac River to Glen Echo and to outlying points east and south of the city. All of these lines carry a heavy regular traffic, and in addition large numbers of pleasure riders and excursionists use them throughout the long summer season.

The bottom framing of the cars is composed as follows: Side sills of special bulb angle, 8 by 6 by ½ in.; crossings of

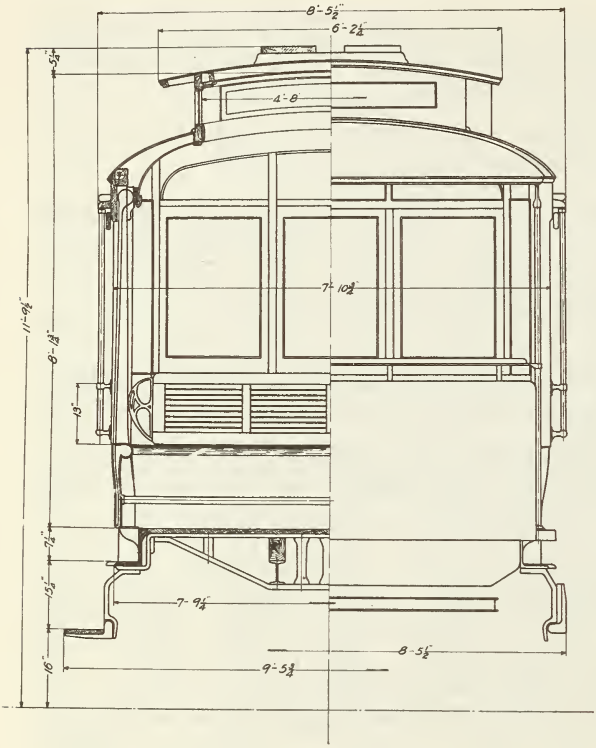


Narragansett Cars for Washington. The cars seat 70 passengers and are mounted on Brill No. 39-E trucks

3½ by 5⅞-in. white oak, secured to the sills with pocket castings; center diagonal braces of 2¾ by 4½-in. oak and oak end diagonal braces, 2½ by 4½ in.; ¾-in. rods are used at each crossing. The bolsters are of the open plate type, with top member 9 by ¾ in. and bottom member 9 by 1 in. The corner posts, which are 3⅝ in. thick, and the side posts 2¾ in., are set into pocket castings bolted to the sills, giving a firm support to the upper structure. The advantages of this construction are apparent—a double step without increasing



NARRAGANSETT CARS FOR WASHINGTON. Side elevation and floor plan showing details of the "Narragansett" step feature



Narragansett Cars for Washington. As the sill step is within the post line, the width over all is no greater than the ordinary single-step double-truck car

the width of the car, and extra strength. The running-boards are of the Brill standard folding type, with hangers bolted to the outward-extending flange of the sill angles. The interiors are finished in ash, with ceilings of composition board, and white wire glass in the deck sash. Three sashes in the bulkheads are arranged to drop into pockets; the side openings are fitted with extra heavy coated Pantasote curtains which can be drawn to the floor. Water troughs are provided under the eaves and the water led off by four pipes, which also serve as grab handles. Folding gates are made of 1-in. channels and, together with the brake handles, alarm gongs, signal bells, round-corner seat-end panels and other specialties, are of the builder's manufacture.

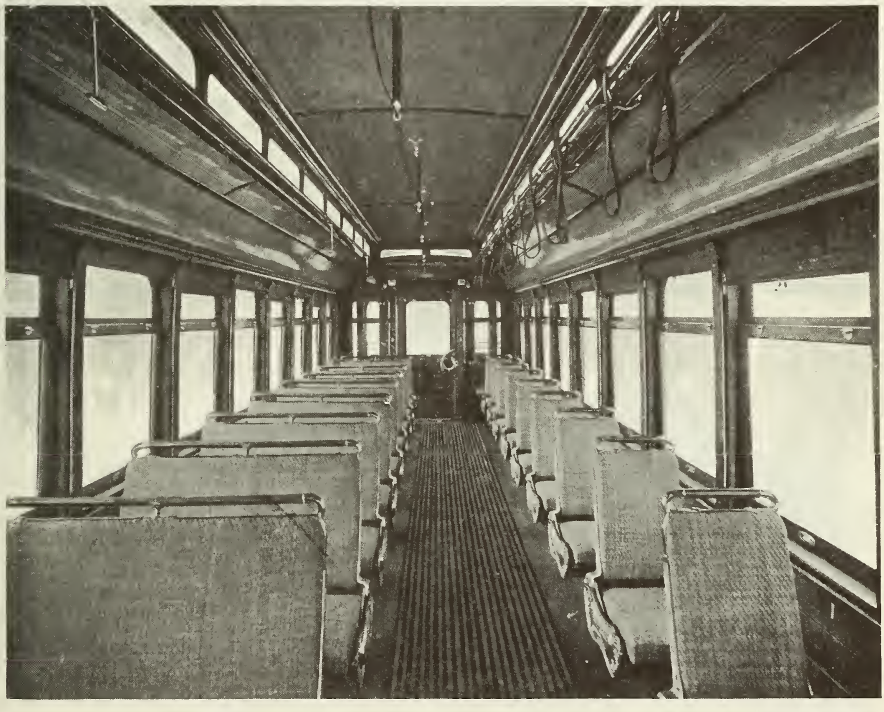
Length over corner posts	40 ft. 0 in.
Centers of side posts	2 ft. 8 in.
Width over Z-bar sills	7 ft. 9¼ in.
Width over posts	7 ft. 10¾ in.
Extreme width	8 ft. 5½ in.
From track to side sills	2 ft. 6½ in.
From track over trolley boards	11 ft. 10½ in.
Track to first step	16 in.
First step to second step	15 in.
Second step to floor	7½ in.
Type of trucks	Brill No. 39-E

Wheel base	4 ft. 6 in.
Diameter of wheels	22 in. and 32 in.
Size of journal	3¾ in.
Type of motors	GE-210B—2-65 hp.
Weight of carbody less electrical equipment	15,525 lb.
Weight of elec. equipment	1,240 lb.
Weight of air brake equip.	1,500 lb.
Weight of trucks	10,600 lb.
Weight of motors	6,760 lb.
Total weight	35,625 lb.

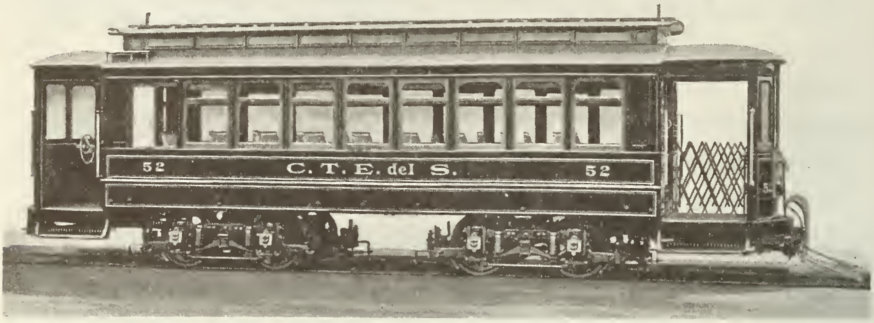
CARS FOR BUENOS AIRES, ARGENTINA

STEPHENSON SEMI-CONVERTIBLE TYPE

THE J. G. Brill Company has recently delivered 12 cars of the Stephenson semi-convertible type to the Cia. Tramways Electricos del Sud, Buenos Aires, mounted on Brill No. 27-G1 trucks. This tramway system operates in the southern part of Buenos Aires and has a trackage of 9¼ miles, with 60 cars in service. During the first three months of the current year, which are summer months in this south temperate zone country, the number of passengers carried was as follows: January, 183,000, February, 196,000 and March, 200,000. The new cars were first built as for domestic



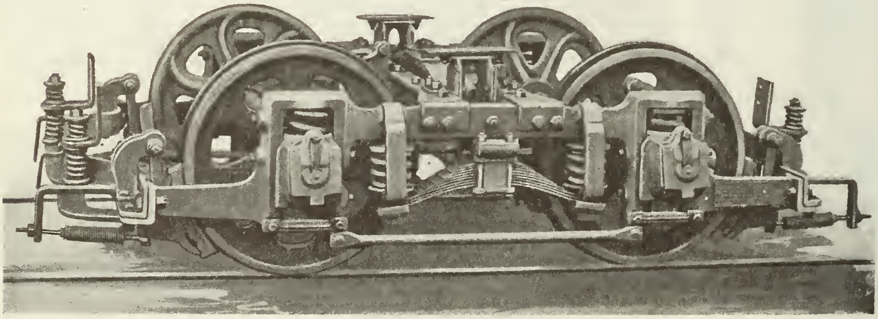
CARS FOR BUENOS AIRES. The single seats are 16½ in. and double seats 37 in. long; aisle width, 42 in. Longitudinal seats for one passenger each at corners. Seating capacity, 31



Cars for Buenos Aires. The lower sashes drop into pockets and the upper sashes raise into the side roof

shipment and then taken apart and boxed for ocean transportation.

The seating plan, as will be seen in the photograph of the interior, consists of double seats on one side of the aisle and single on the other, and longitudinal corner seats for one passenger each. The reason for this seating arrangement is to provide extra standing space in the aisle; the width of the car would permit double seats on both sides, but the standing space is considered of the greater importance. It will be noticed that a hand pole with straps is on one side only. The single seats are 16½ in. and the double are 37 in. long, leaving the aisle 42 in. wide. The window system of the Stephenson



Cars for Buenos Aires. The Brill No. 27-G1 truck on which the cars are mounted have outside hung brakes and Half-Ball brake hangers semi-convertible type comprises a lower sash which drops into a pocket and an upper sash which raises into a recess back of the letter panel. Double sliding doors of the mutually-operating type have a clear opening width of 39⅜ in. The interiors are finished in cherry and the ceilings are of 3-ply birch veneer; all of the metal trimmings are of nickel bronze. The vestibules have drop-sash windows and folding gates at each side. The bottom framing is made up as follows: Side sills, yellow pine 4 by 7 in., reinforced with 12 by ⅜-in. steel plates on the inside; oak end sills, 5¼ by 6⅞ in.; oak crossings, 4½ by 5½ in.; inside truss rods, 2 by 1½ in. The bolsters have 9 by ⅝-in. top plate and 9 by ⅞-in. bottom plate. The trucks, which are of the Brill No. 27-G1 type, are equipped with outside hung-brakes and have Brill Half-Ball brake hangers.

Length over corner posts	26 ft. 4½ in.
Length over platforms	36 ft. 0⅞ in.
Length of platforms	4 ft. 10⅛ in.
Centers of side posts	2 ft. 7 7/16 in.
Width over sills	7 ft. 9¼ in.
Width over posts	8 ft. 0 in.
Extreme width	8 ft. 2 7/16 in.
From track to side sills	2 ft. 8¼ in.
From side sills over trolley boards	8 ft. 11 15/16 in.
From track to step	16½ in.
From step to platform	14½ in.
Platform to floor	8⅛ in.

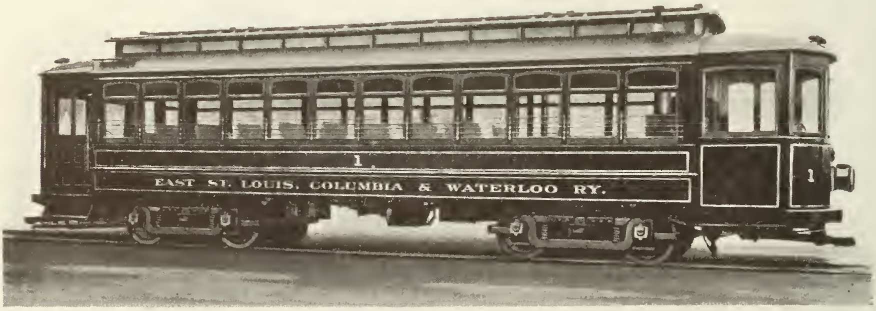
Seating capacity	31
Type of trucks	Brill No. 27-G1
Wheel base	4 ft. 6 in.
Diameter of wheels	33 in.
Size of journal	3¾ in.
Type of motors	GE90—4-50 hp.
Weight of car body less elec. equipment	18,500 lb.
Wt. of electrical equipment	1,500 lb.
Weight of magnetic brakes	1,500 lb.
Weight of trucks	14,000 lb.
Weight of motors	11,500 lb.
Total weight	47,000 lb.

CARS FOR NEW LINE FROM EAST ST. LOUIS TO WATERLOO

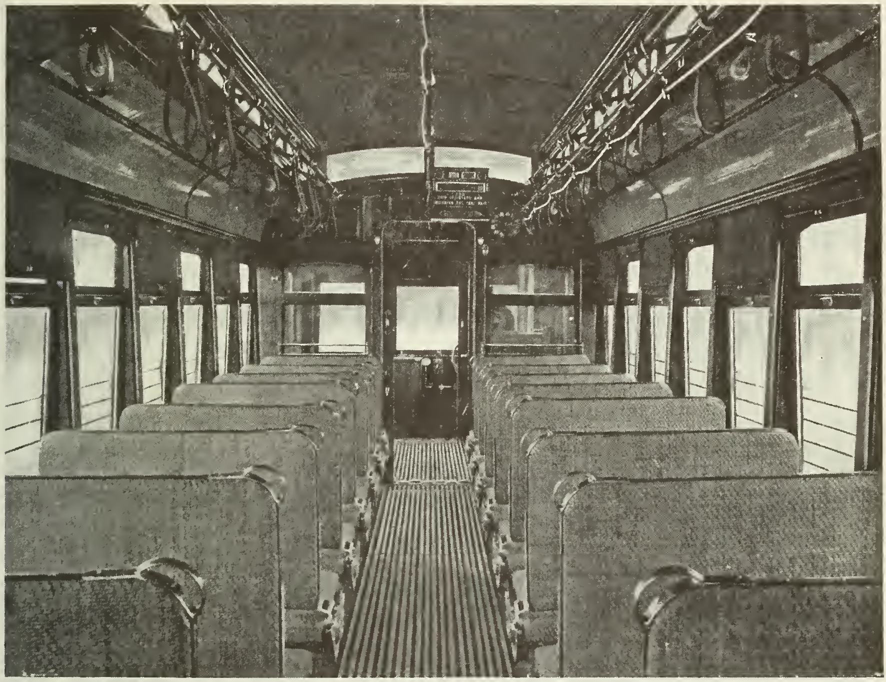
PASSENGER AND EXPRESS TYPES

THE East St. Louis, Columbia & Waterloo Railway Company has received five cars, built by the American Car Company, equipped and ready for service, and a baggage and express car of a later order will soon be delivered. All of the cars are mounted on Brill No. 27-MCB1 trucks, capable of a speed of 50 miles per hour. This line will soon be completed to Waterloo, Illinois, a distance of about 22 miles from East St. Louis, and it is the first electric line to be constructed from this center of population into Southern Illinois territory. It will undoubtedly hasten the development of a valuable territory that has long lain dormant owing to lack of good transportation accommodations. With the exception of the streets in East St. Louis, Columbia and Waterloo, the company has private right of way which will enable the cars to make very good time as soon as the roadbed becomes well settled. There are few grades and the maximum is but 2 per cent, and the curvature does not exceed 10 degrees outside of the street sections. The road is constructed on first-class lines with the view of handling freight as well as passenger business, and it is anticipated that a good freight business will eventually be built up. The territory south of Waterloo offers excellent inducements for further extension and the road will, no doubt, be extended beyond that point. The reason the cars were not constructed of the usual heavy suburban type was the necessity of having a car of this class in order to cross the Eads Bridge into St. Louis.

The passenger cars are built on composite bottom frames,



CARS FOR EAST ST. LOUIS-WATERLOO. The cars are designed to enable them to cross the Eads Bridge into St. Louis and to facilitate operation on city sections of the line. Mounted on Brill No. 27-MCB1 trucks



CARS FOR EAST ST. LOUIS-WATERLOO. The general compartment seats 36 passengers and the longitudinal seats in the smoking compartment accommodate 12

having long-leaf yellow pine side sills, 4 by 6⅞ in., reinforced on the inside with steel plates 15½ by ⅜ in., and at the bottom with 6 by 5½ by ⅜-in. angles, the lower leg of which extends beyond the side sill and supports the nailing strip for panels and stringers and also forms a base upon which the side sashes rest when lowered into window pockets. Truss rods are supported on forged standards and tie rods extend through the body under the window sills.

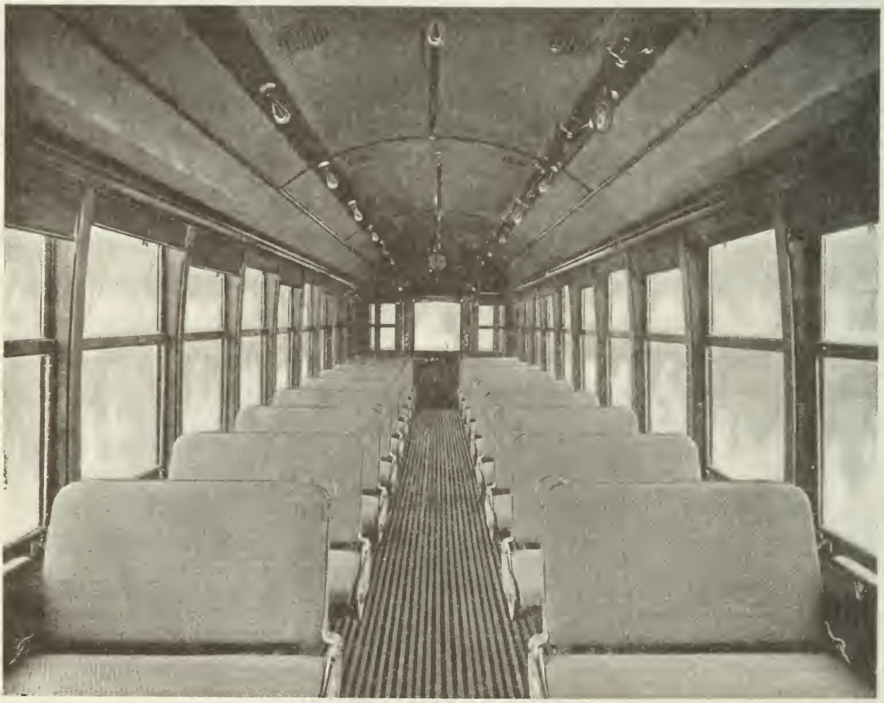
Length over corner posts	33 ft. 4 in.
Length over platforms	44 ft. 4 in.
Length of platforms	5 ft. 6 in.
Length of passenger comp.	24 ft. 8 in.
Length of smoking comp.	8 ft. 8 in.
Centers of side posts	2 ft. 8 in.
Width over sills	8 ft. 6 in.
Width over posts	8 ft. 8 in.
Extreme width	8 ft. 8 in.
From track to side sills	2 ft. $11\frac{7}{16}$ in.
From track to step	$17\frac{9}{16}$ in.

From side sills over trolley boards	9 ft. 6⅝ in.
From floor to center of headlining	8 ft. $4\frac{11}{16}$ in.
Step to platform	15 in.
Platform to floor	9¾ in.
Seating capacity	48
Type of trucks	Brill No. 27-MCB1
Wheel base	6 ft. 0 in.
Diameter of wheels	34 in.
Type of motors	GE203

SEMI-CONVERTIBLE CARS FOR NEW ENGLAND INTERURBAN LINE

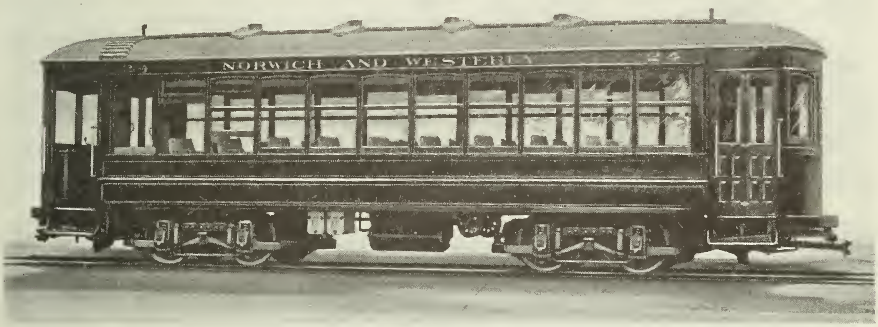
STEEL UNDERFRAMES

THE Norwich & Westerly Traction Company a short time ago replaced the heavy high-speed cars on their lines with motor cars of the semi-convertible type built by The J. G. Brill Company. The new cars, while much lighter and smaller than the former equipment, are better suited to the traffic conditions of the line. The former cars, being heavy, were expensive to operate, and the high speed obtainable was unnecessary. The Norwich & Westerly Traction Company operates a 26-mile interurban line between



Cars for Norwich-Westerly. The high windows and light woodwork give a bright and attractive appearance to the interior

Norwich, in the eastern part of Connecticut, and Westerly, in the southwestern part of Rhode Island, then northeast to Ashaway, R. I. The new cars are run on an hourly schedule and make the trip between Norwich and Ashaway within two hours. The section between Ashaway and Westerly, 4 miles in length, furnishes the greatest traffic, but the cars are frequently crowded when operating on the sections within four miles of Norwich & Westerly. During the summer months the cars carry many pleasure riders, as the route affords views of the beautiful scenery characteristic of that section of the Long Island Sound country; during the other months of the year, the through traffic between Norwich and Westerly is light. The cars are built with the Brill Plain Arch roof, containing four "Eureka" ventilators on each side of the car, and are mounted on Brill No. 27-GE1 trucks. The vestibule doors are equipped with the builder's door controlling device, and the center sash can be raised to any height by means of the Brill sash adjuster; other vestibule sashes drop into pockets. The seats are of the Brill "Winner" type; 9 transverse seats on each side of the aisle, with longitudinal corner seats for two passengers each, give a seating capacity of 44. Cherry constitutes the interior finish, with headlinings of 3-ply birch veneer.



CARS FOR NORWICH-WESTERLY. A typical Brill semi-convertible Plain Arch roof car, Mounted on Brill No. 27-GE1 trucks

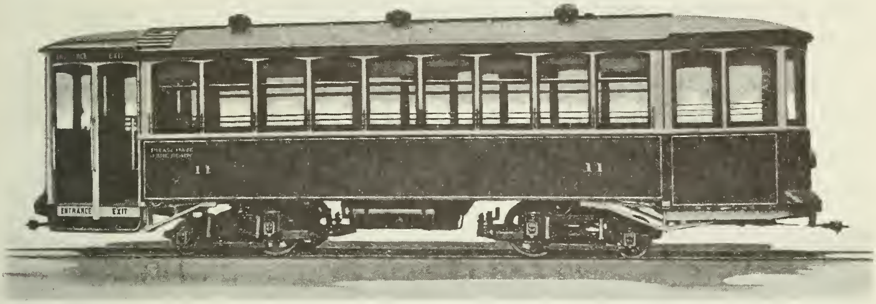
The cars are built on steel underframes, with side sills of 18 by 3/16-in. plates, reinforced at the top with a 3 by ½-in. plate and at the bottom with 2½ by 2½ by ⅜-in. angles; the end sills are formed of 10-in. channels. The stringers and crossings are made of channel steel, the latter in the form of open trusses and secured to the side posts by substantial gusset plates. The platforms are supported on angle center knees and skeleton outside knees of 4-in. channel. The body framing is constructed with straight-grained ash corner posts 3⅝ in. thick, and side posts 2¼ in.; sweep of posts, 1¾ in.

Length over corner posts	30 ft. 8 in.	Size of journals	3¾ in.
Length over platforms	40 ft. 1 in.	Type of motors	West. 101B2—4-40 hp.
Length of platforms	4 ft. 8½ in.	Weight of car body less electrical equipment	17,000 lb.
Centers of side posts	2 ft. 8 in.	Weight of electrical equip.	2,400 lb.
Width over sills	7 ft. 10½ in.	Wt. of air brake equipment	1,500 lb.
Seating capacity	44	Weight of trucks	11,400 lb.
Type of trucks	Brill No. 27-GE1	Weight of motors	10,920 lb.
Wheel base	4 ft. 6 in.	Total weight	43,220 lb.
Diameter of wheels	33 in.		

FIRST P-A-Y-E CARS FOR CHILLICOTHE, OHIO

BRILL No. 39-E TRUCKS

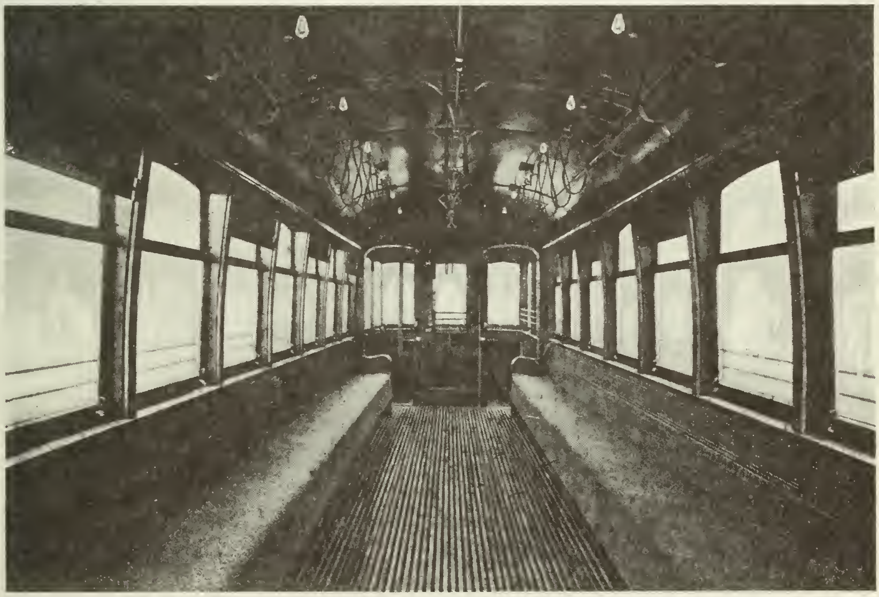
SEVERAL handsome cars have recently been delivered to the Chillicothe Electric Railroad, Light & Power Company, by the G. C. Kuhlman Car Company, and have been put in service on the city lines. The prepayment method of fare collection is being inaugurated with these new cars and, as the public and railway company are well pleased with them, it is intended soon to equip the entire system with this type of car. Heretofore single-truck cars have been operated and these are the first to be mounted on double-



Cars for Chillicothe. The cars have 25 ft. 4-in. bodies and 6 ft. 6-in. platforms. Mounted on Brill No. 39-E trucks

trucks of the single-motor type, an innovation which is also giving much satisfaction.

Chillicothe is a beautiful little city of 15,000 people, with wide streets and many handsome residences. It is situated in the center of the fertile Scioto Valley, 50 miles south of Columbus, on the Baltimore & Ohio Southwestern, Norfolk &



Cars for Chillicothe. The P-A-Y-E railing is brought around from the bulkhead panel to a wooden stanchion located 15 in. from the vestibule doors which fold against it

Western, and the Cincinnati, Hamilton & Dayton Railroads, and has the distinction of having been the first capital of the State of Ohio.

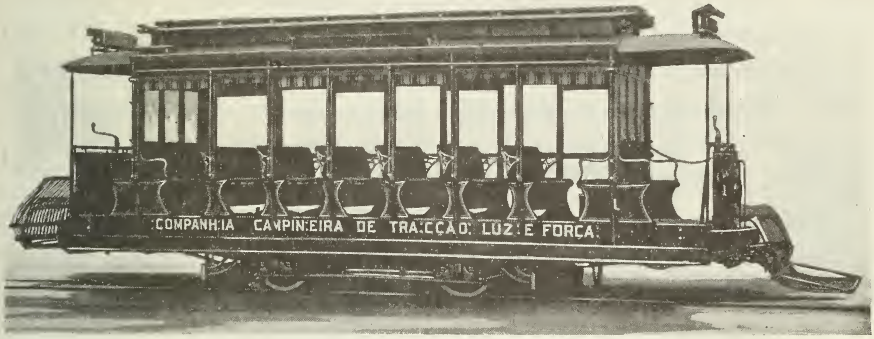
While the side post construction of the new cars is of the Brill semi-convertible type and there are window pockets in the roof, the lower sashes only are operative and raise their full height. The platforms have openings at one side only, and have pay-as-you-enter railings, vestibule doors and doors in body ends similar to those of the Portsmouth cars (see page 204). The bottom framing is of semi-steel construction, with needle beams of channel section and platform knees of skeleton form composed of channels placed back to back with I-beam spacers. The corner posts are 3⅝ in. thick and side posts 2¾ in. The sides of the car are straight and are covered with sheet steel; the vestibules are also sheathed with steel.

Length over corner posts	25 ft. 4 in.	Step to platform	14½ in.
Length over platforms	38 ft. 4 in.	Platform to floor	9⅝ in.
Length of platforms	6 ft. 6 in.	Seating capacity	36
Centers of side posts	2 ft. 8 in.	Type of trucks	Brill No. 39-E
Width over sides	8 ft. 4 in.	Wheel base	4 ft. 6 in.
Extreme width	8 ft. 6¾ in.	Diameter of wheels	21 in. and 33 in.
From track to side sills	2 ft. 8⅝ in.	Size of journals	3 in. and 3¾ in.
From side sills over trolley boards	8 ft. 11⅝ in.	Type of motors	GE80—2-40 hp.
From floor to center of head-lining	7 ft. 9⅝ in.	Weight of car body, less electrical equipment	18,660 lb.
Track to step	15⅜ in.	Weight of trucks	9,280 lb.

INITIAL EQUIPMENT FOR CAMPINAS, BRAZIL

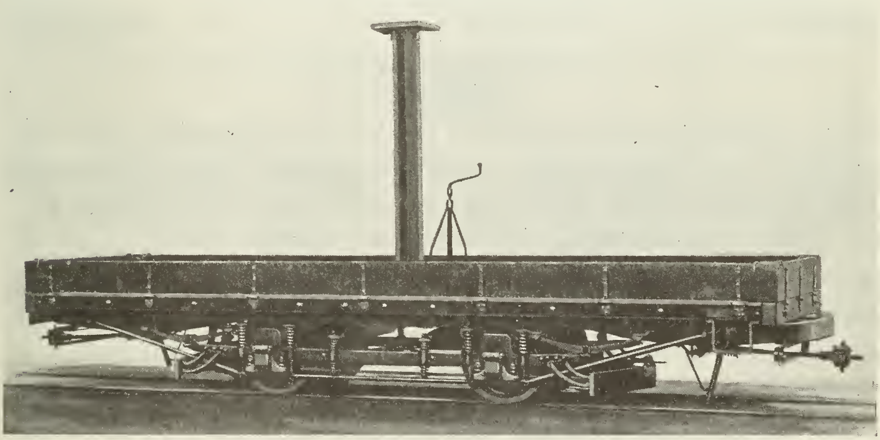
PASSENGER AND CONSTRUCTION CARS

AMONG the recent foreign shipments of The J. G. Brill Company were eight 10-bench open cars, three single-truck gondola cars and one double-truck gondola car, also five extra trucks of the Brill No. 21-E type. These were



CARS FOR CAMPINAS. Standard 10-bench open car mounted on Brill No. 21-E truck

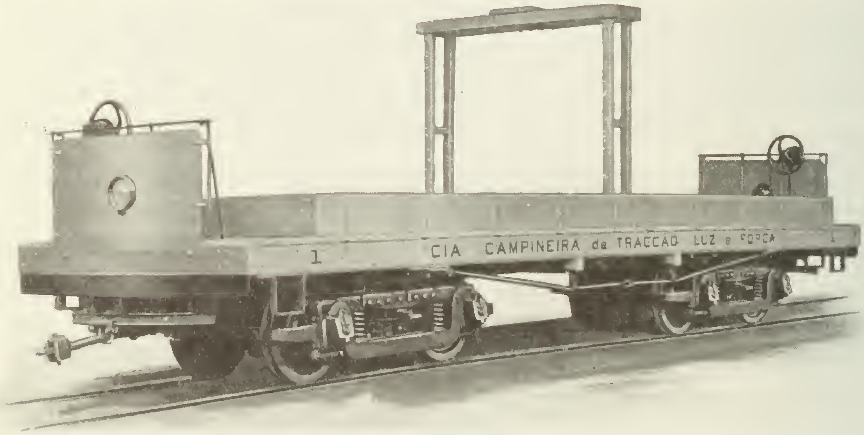
for the Cia. Campineira de Traccao Luz e Forca, of Campinas, in the State of Sao Paulo, Brazil. The State of Sao Paulo is a coast state, just below the State of Rio Janeiro, and its principal port, Santos, is 200 miles south of the City of Rio Janeiro. Sao Paulo has been among the most important sections of South America in regard to steam railway development, the lines centering at the City of Sao Paulo, which is about 25 miles from its port of Santos. About 50 miles inland from the city of Sao Paulo is Campinas, which is the radiating point of all the railways in the northern part of the



CARS FOR CAMPINAS. A useful type of gondola car mounted on Brill No. 21-E truck state. The city has a population of 90,500 and is an important commercial center.

The gondola cars of both types are of rugged construction and well adapted to carrying heavy loads of all kinds of material. The longer car, with its powerful trucks of the Brill No. 27-MCB type, will serve also as a locomotive.

The passenger cars are the standard 10-bench open type of the builder, used in large numbers in Sao Paulo, Bahia and other Brazilian cities. This type is too well known to need a detailed description; it is almost invariably mounted on Brill No. 21-E trucks, as in the present cars. The cars represent the initial equipment of the lines at Campinas, and the open passenger cars are entirely suited to the form of service and climatic conditions. The heavy rainfall during the short wet season has been taken into account, and the cars have been provided with a wide water board, forming a trough above the eaves and having four iron pipe leaders to carry off the water; these leaders also serve as grab handles, as will be seen in the photograph.



CARS FOR CAMPINAS. Car for construction work, general utility and locomotive service. Mounted on Brill No. 27-MCB trucks

The principal dimensions and weights of the open passenger cars are as follows:

Length over crown pieces	27 ft. 3½ in.	Diameter of wheels	33 ir.
Centers of side posts	2 ft. 6 in.	Size of journal	3¾ in.
Width over sills	5 ft. 4½ in.	Type of motors	West. 101G—2-40 hp.
Width with steps up	6 ft. 0 in.	Weight of car body, less electrical equipment	7,000 lb.
Extreme width	6 ft. 7½ in.	Wt. of electrical equipment	1,100 lb.
Width with steps down	7 ft. 0 in.	Weight of truck	6,120 lb.
Seating capacity	40	Weight of motors	5,400 lb.
Type of trucks	Brill No. 21-E	Total weight	19,620 lb.
Wheel base	7 ft. 6 in.		

The principal dimensions and weights of the single-truck gondola cars are as follows:

Length over end sills	24 ft. 0 in.	Size of journal	3¾ in.
Width over sills	6 ft. 6 in.	Type of motors	West. 101G—2-40 hp.
Extreme width	6 ft. 8 in.	Weight of car body, less electrical equipment	4,250 lb.
From track to side sills	2 ft. 2⅝ in.	Weight of electrical equipment	1,200 lb.
Track to step	21 in.	Weight of truck	5,800 lb.
Step to floor	15¼ in.	Weight of motors	5,400 lb.
Type of trucks	Brill No. 21-E	Total weight	16,650 lb.
Wheel base	7 ft. 6 in.		
Diameter of wheels	33 in.		

The principal dimensions and weights of the double-truck gondola car are as follows:

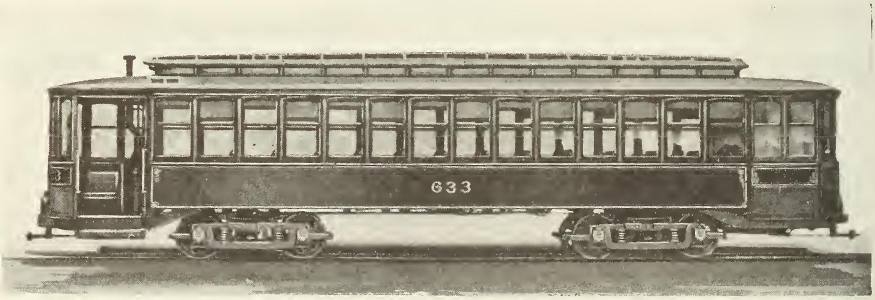
Length over platforms	35 ft. 0 in.	Type of motors	West. 101G—4-40 hp.
Width over sills	8 ft. 0 in.	Weight of car body, less electrical equipment	7,500 lb.
From track to side sills	2 ft. 8¾ in.	Weight of electrical equipment	1,300 lb.
Track to step	22¾ in.	Wt. of air brake equipment	1,500 lb.
Step to floor	20½ in.	Weight of trucks	13,720 lb.
Type of trucks	Brill No. 27-MCB1	Weight of motors	10,800 lb.
Wheel base	6 ft. 0 in.	Total weight	34,820 lb.
Diameter of wheels	33 in.		
Size of journal	3¾ in.		

SUBURBAN CARS FOR COLUMBUS, OHIO

STEEL UNDERFRAMES

THE G. C. Kuhlman Car Company furnished to the Columbus Railway & Light Company a number of suburban cars sometime ago which have several interesting features. The cars are built on steel underframes made up of 4-in. 5.25-lb. channels and end sills of 10-in. channels, and have two 3-in. heavy conduit pipes in lieu of center sills, which form an integral part of the frame. These pipes are made up with condulets in the proper places each side of the bolster for the motor leads to come out, and also near the center for the wires which lead to resistance; near each end a long reverse-sweep base-elbow is used to attach the pipes to the end sills, to which they are securely riveted, and the pipes extend down and under the end sills and along under each platform to a junction box of sheet steel where the power cables are connected to the controller. The side framing is composed of an outer sheet of steel and an inner plate reinforced with 4-in. channel in a single piece from end to end made in the form of a W brace, the object being to carry the platforms on the braces instead of on the inner plates. The sheathing plates extend from post to post, so that if damaged in service a section can be readily replaced. The larger air space than ordinary in the side construction prevents radiation of heat to a greater extent. The side plates are secured to the inner plates by angles.

The window arrangement consists of stationary upper sashes and lower sashes arranged to raise their full height; the sashes in the end of the vestibules drop into pockets, and at the side opposite the entrance the upper sashes are stationary and the lower drop. At the opposite side of the platform



CARS FOR COLUMBUS. The steel underframe is of novel construction and adapts the comparatively light body with long platforms to heavy and fast suburban service. Mounted on Brill No. 27-MCB1 trucks from the entrance at each end of the car is a seat accommodating three passengers; the seats in the body are placed transversely and there are longitudinal corner seats, giving a total seating capacity to the car of 62 passengers.

Length over corner posts	35 ft. 5¼ in.	From floor to center of headlining	8 ft. 4⅞ in.
Length over platforms	47 ft. 5¼ in.	Step to platform	14 in.
Length of platform	6 ft. 0 in.	Platform to floor	11⅛ in.
Centers of side posts	2 ft. 6 in.	Seating capacity	62
Width over sides	8 ft. 1 in.	Type of trucks	Brill No. 27-MCB1
Extreme width	8 ft. 4 in.	Type of motors	GE-216—4
From track to side sills	2 ft. 11¼ in.	Weight of carbody less electrical equipment	23,900 lb.
From side sills over trolley boards	9 ft. 7¼ in.	Weight of trucks	15,800 lb.
Track to step	16¼ in.		

* * *

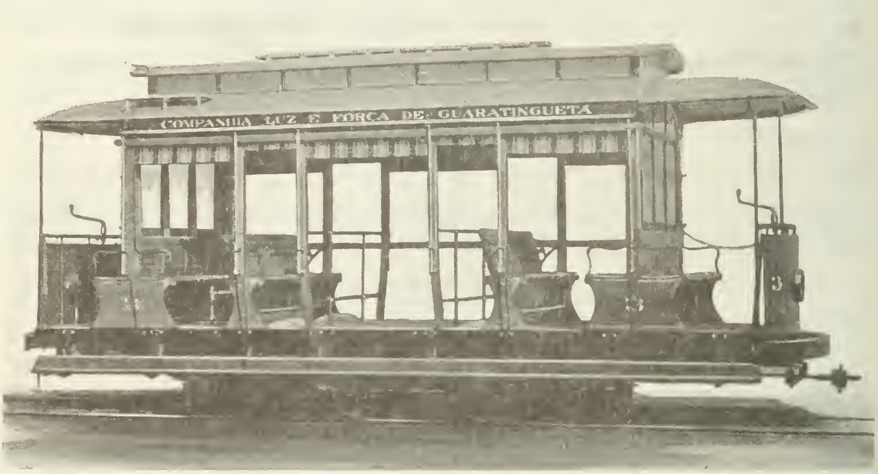
OPEN CARS FOR GUARATINGUETA, BRAZIL

BRILL NO. 21-E TRUCKS

AN interesting innovation in open cars was included in a recent shipment of The J. G. Brill Company to Guaratingueta, Brazil, and consists of a central baggage section occupying the space of two benches. These, with several 8-bench standard open cars, constitute the initial equipment of the Companhia Luz e Forca de Guaratingueta. Guaratingueta is situated in the State of Sao Paulo, on the Parahiba River, between Sao Paulo and Rio Janeiro, and has a population of 46,000.

As the illustration shows, a baggage section is located at the center of the car, taking the place of two seats, and is separated from the seat spaces by pipe railings. The seats are of the spindle-back type, four being stationary and two reversible, giving the car a seating capacity of 30. The 8-bench cars seat 40. Passengers are, of course, permitted to stand in the baggage section when there is room. This space is provided chiefly for the accommodation of the considerable amount of bulky hand baggage carried by a large proportion of the patrons of the lines and also for handling light freight.

The bottom framing of all the cars is constructed of 3¾ by 7-in. yellow pine side sills, reinforced with 7 by ½-in. steel plate. The crossings are of oak, 2¾ by 4½ in., and the crown pieces 2¾ by 11 in. The upper structure is composed of straight-grained ash corner posts, 3⅝ in. thick; side posts of the same, 2¾ in. thick; sweep of posts, 5 in. The roofs are supported on compound rafters, the steel members being ⅝-in. thick.



CARS FOR GUARATINGUETA. The open section at the center is for the accommodation of bulky hand baggage and light freight. The cars are mounted on Brill No. 21-E trucks

Length over corner posts	15 ft. 8 in.	Step to floor	15¼ in.
Length over platforms	23 ft. 4⅜ in.	Seating capacity	30
Length of platforms	4 ft. 0 in.	Type of trucks	Brill No. 21-E
Centers of side posts	2 ft. 8 in.	Wheel base	6 ft. 0 in.
Width over sills	6 ft. 3 in.	Diameter of wheels	30 in.
Width over posts	7 ft. 0½ in.	Size of journal	3½ in.
Extreme width	7 ft. 9½ in.	Type of motors	GE-58—2-37 hp
From track to side sills	2 ft. 1⅛ in.	Weight of car body less electrical equipment	6,500 lb.
From side sills over trolley boards	8 ft. 10⅞ in.	Wt. of elec. equip. on body	940 lb.
From floor to center of headlining	7 ft. 11 in.	Weight of truck	4,800 lb.
Track to step	16⅞ in.	Weight of motors	4,300 lb.

THE J. G. BRILL COMPANY

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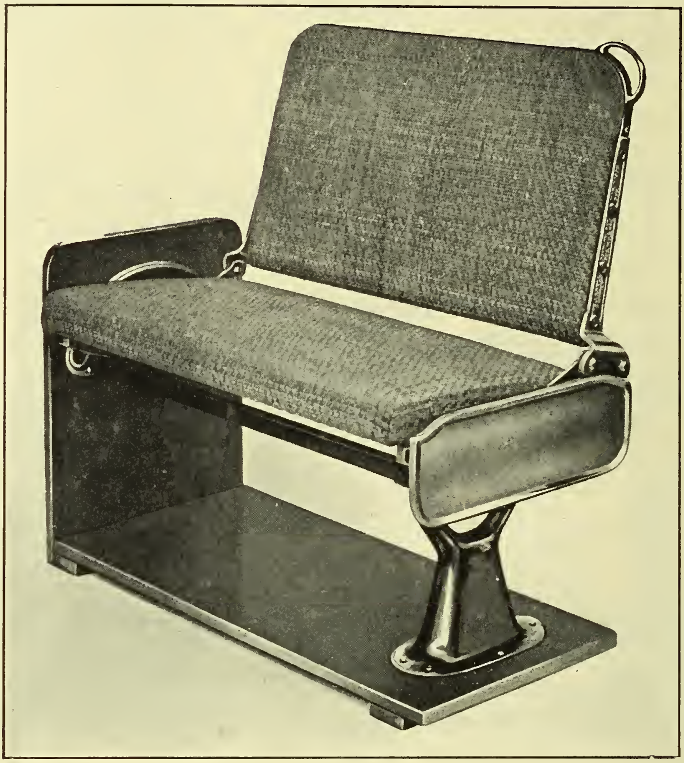
Write the new address on the envelope in which this Magazine is received and return the envelope to the Publicity Department, The J. G. Brill Company



BRILL "WINNER" SEAT

PATENTED

This seat has a one-piece pressed steel pedestal and pressed steel aisle and wall plates. It is the lightest seat made, and the method of constructing the pedestal and use of angle iron crossings make it the strongest seat on the market. The seat is upholstered in woven cane of Brill manufacture, or in plush, leather or imitation leather. Backs are made any height, plain or three-part.

THE J. G. BRILL COMPANY

PHILADELPHIA - - - PENNSYLVANIA

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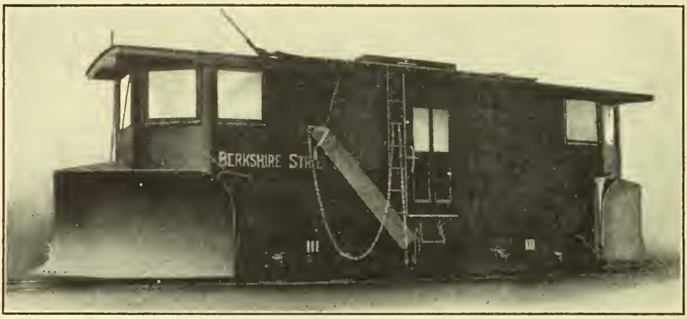
Vol. VI. AUGUST, 1912 No. 8

BRILL MAGAZINE

Walnut Street
Kansas City, Mo.



BRILL SNOW PLOWS

This is one of nine types of snow plows shown in our catalog. No unnecessary weight has been incorporated in the double-truck plow cars, as the plows are removable and the cars are used in baggage and express service during the greater part of the year. The plowshares are designed to reduce the impact of the snow to the minimum consistent with operating conditions and thus increase the rate of speed to which the cars may be put while negotiating deep or drifted snow. The plows are raised or lowered on substantial guides which are bolted and braced to the car sills and are amply strong to resist the severest strain made by deep or firmly packed snow. The plow lifts are arranged for operation by either air power or hand, or both. In every detail, as well as in the general plan, these plow cars have been developed to the most advanced stage of efficiency and are capable of meeting all demands of modernly-equipped maintenance-of-way departments of city and interurban railways.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

JAMES DALRYMPLE

PRESIDENT, GLASGOW MUNICIPAL TRAMWAYS

SUPPLEMENT TO BRILL MAGAZINE
AUGUST, 1912

BRILL MAGAZINE

Vol. VI AUGUST, 1912 No. 8

JAMES DALRYMPLE

[WITH PORTRAIT INSERT]

JAMES DALRYMPLE, president of the Glasgow Municipal Tramways and one of the leading tramway men of Europe, was born in Galloway, Scotland, in 1860. At an early age his parents moved their residence to Glasgow, and in 1861 he entered the employ of the office of the city chamberlain. After a few years he was transferred to the office of the city registrar, where he remained until 1894, at which time the corporation took over the tramways from the Glasgow Tramway & Omnibus Company, when he was appointed accountant of the new municipal department. He later rose to be deputy manager of the system, and in 1904 became its manager. Under his management (he has now reached his eighth anniversary), the tramways have experienced a long period of progressiveness, £55,000 being added to the finances of the city in 1910 as profits from this department. Mr. Dalrymple is a born organizer, and the excellent service the tramways of Glasgow are giving to the people is evidence enough of this fact. When the Glasgow tramway strike broke out last year and a general strike among municipal employees threatened, the whole trouble was brought amicably to an end through the personal influence of Mr. Dalrymple. The satisfactory manner in which he has handled other various difficulties of the system, as well as the strike, has won for him even the admiration of the keenest opponents of his policies in the Town Council. In 1905 he visited a number of the largest cities of this country to obtain a first-hand knowledge of American street railway practice and, at the request of the mayor of Chicago, made a report on the street railway situation in that city. Mr. Dalrymple was president of the Municipal Tramways Association of Great Britain in 1910-11.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

KANSAS CITY, MISSOURI*

KANSAS CITY, the "Gateway to the Southwest," one of the principal railway centers of the United States, is situated at the confluence of the Missouri and Kansas Rivers, 235 miles west by north of St. Louis. It has a population of 248,381, and Kansas City, Kansas, across the Kansas River and to which it is connected by numerous bridges, has a population of 82,331. The city is served by the Union Pacific, the Missouri Pacific, the Frisco System, the Chicago, Burlington & Quincy, the Atchison, Topeka & Santa Fe, the Chicago Great Western, the Chicago, Milwaukee & St. Paul, the Chicago & Alton, the Wabash, the Kansas City Southern, the Chicago, Rock Island & Pacific, the Missouri, Kansas & Texas, the Leavenworth, Kansas & Western, the Kansas City,

Kansas City Traffic Conditions and Cars. Swope Park, the principal park of the city, is outside the municipal boundaries, seven miles from the center, and is reached by a direct route

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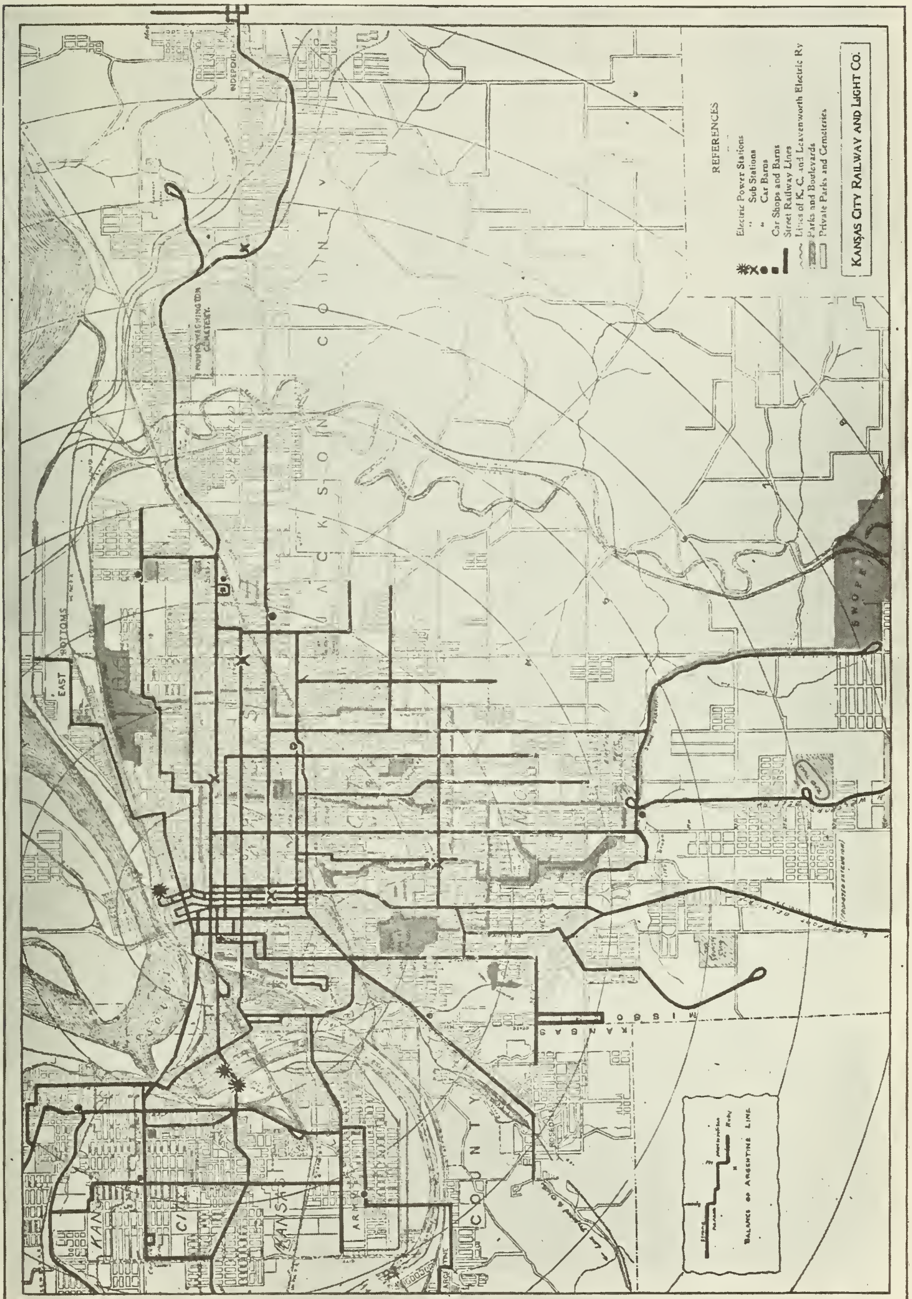
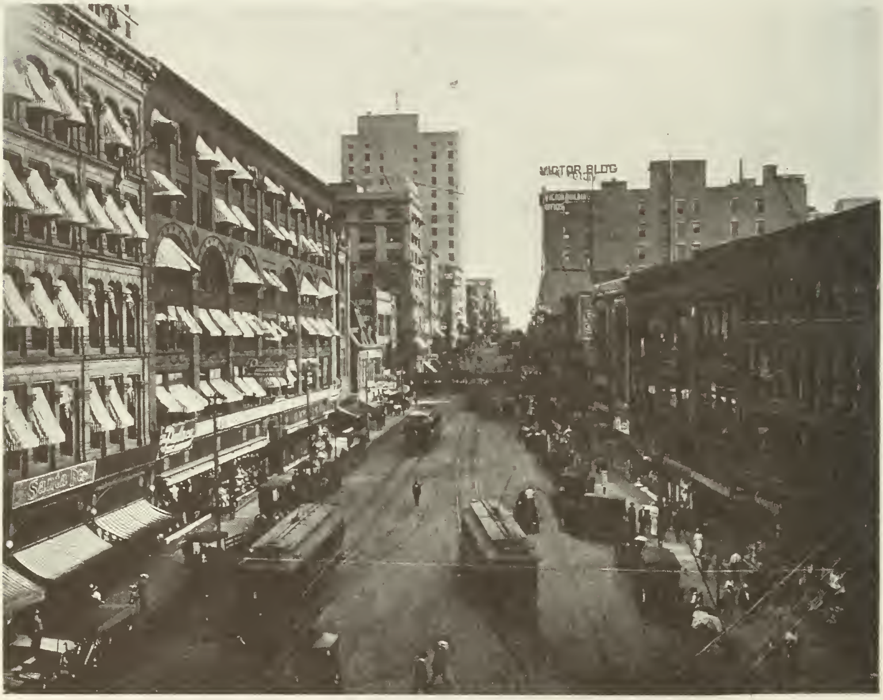
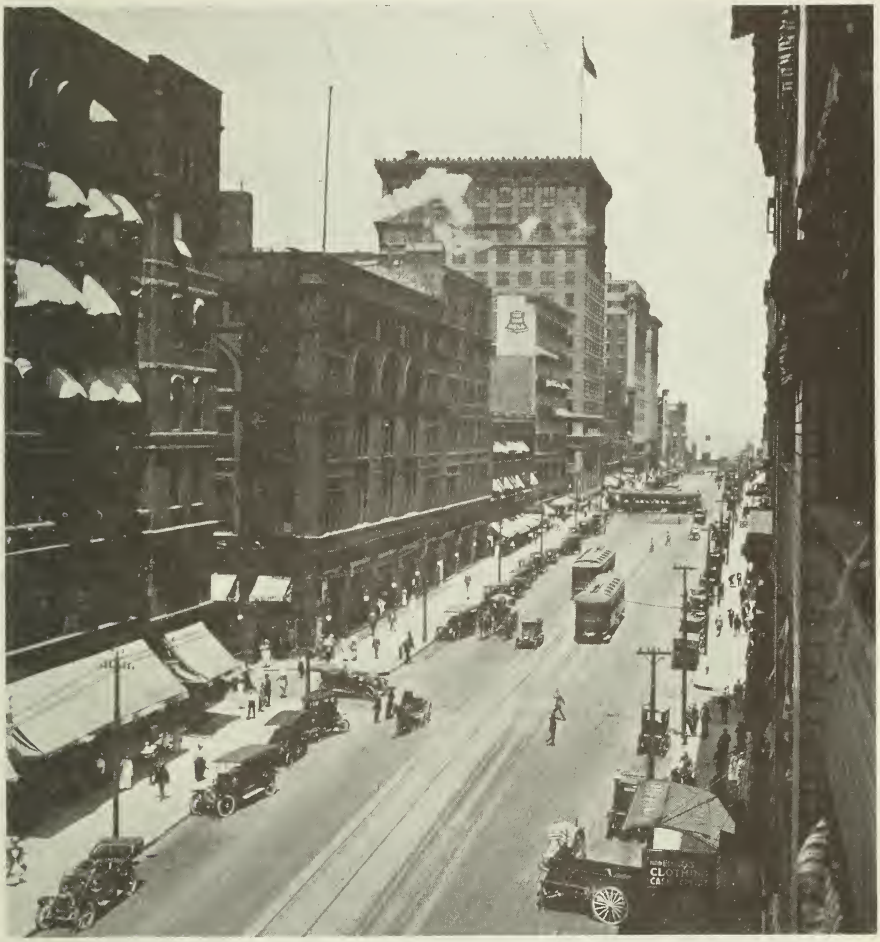
* The forty-fourth article of this series.


KANSAS CITY RAILWAY AND LIGHT CO.
REFERENCES
Electric Power Stations
" Sub Stations
" Car Barns
Car Shops and Barns
Street Railway Lines
Lines of K. C. and Leavenworth Electric Ry
Parks and Boulevards
Private Parks and Cemeteries
JACKSON COUNTY
KANSAS
MISSOURI
EAST BOTTOMS
INDEPENDENCE
MOUNT WASHINGTON CEMETERY
SWOPE PARK
KANSAS CITY
ARMOURDALE
ROSEDALE
BALANCE OF ARGENTINE LINE

Mexico & Orient, the St. Louis, Kansas City & Colorado, the Quincy, Omaha & Kansas City, and the St. Joseph & Grand Island Railways, and by steamboat lines to various river ports. In the central part of the city, where there were once high bluffs and deep ravines, are the great retail, office and wholesale buildings on well-graded streets, and to the south and west of this highland, along the Kansas River, is a low, level tract occupied chiefly by railway yards, stock yards and manufacturing establishments. To the north and east of the central section is a large, level district along the Missouri River, much of which is "made" land and occupied largely by factories, railway yards and grain elevators. Across the Missouri River there are two great railway bridges, and over the Kansas River are numerous bridges and a great interstate viaduct extending across the valley. The streets are generally



Kansas City Traffic Conditions and Cars. Main Street, looking south from "The Junction." More cars pass through this thoroughfare than any traversed by the lines

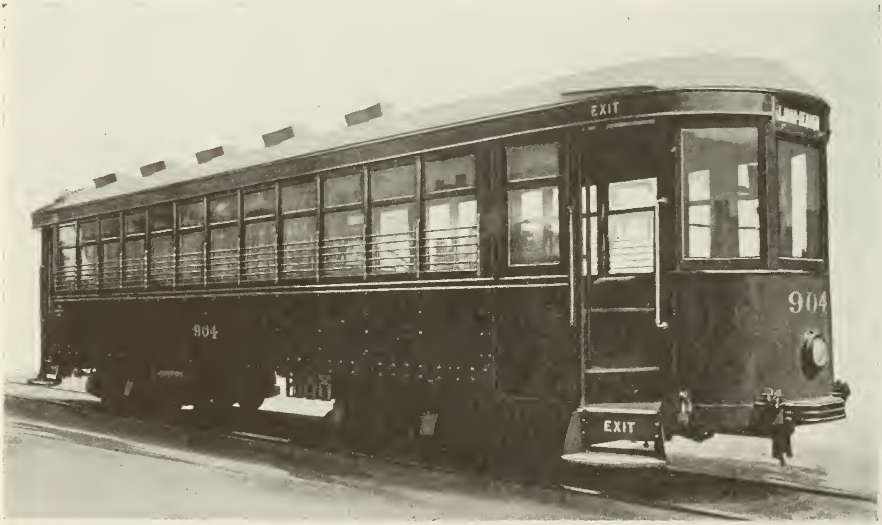


KANSAS CITY TRAFFIC CONDITIONS AND CARS. Grand Avenue, looking north from Twelfth Street, the center of the shopping, hotel and theatre district

wide and well paved, and there are a number of fine boulevards. The public and business buildings, churches and other structures are large and of fine proportions, and the city throughout is distinctly modern and metropolitan. Kansas City is primarily a commercial center, with live stock, grain and agricultural implements as its principal trade. One of the earliest electric trolley lines in the United States was installed in this city in 1885.

KANSAS CITY TRAFFIC CONDITIONS AND CARS. Walnut Street at night, showing the brilliant illumination characteristic of the principal streets of Kansas City

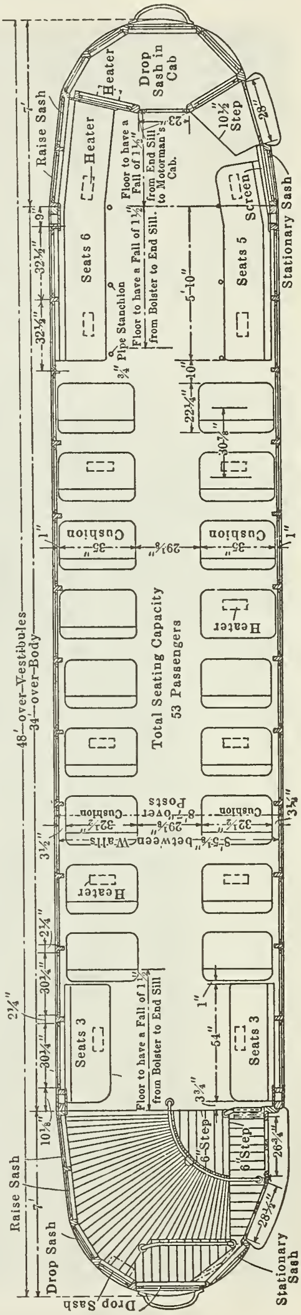
The Kansas City lines are owned and operated by the Kansas City Railway & Light Company and consist of 123¾ miles of double track and 14 miles of single track, and have a total trackage of 263⅓ miles; gage of track, 4 ft. 8½ in.; radius of shortest curve, 37 ft. 7½ in,; maximum grade,



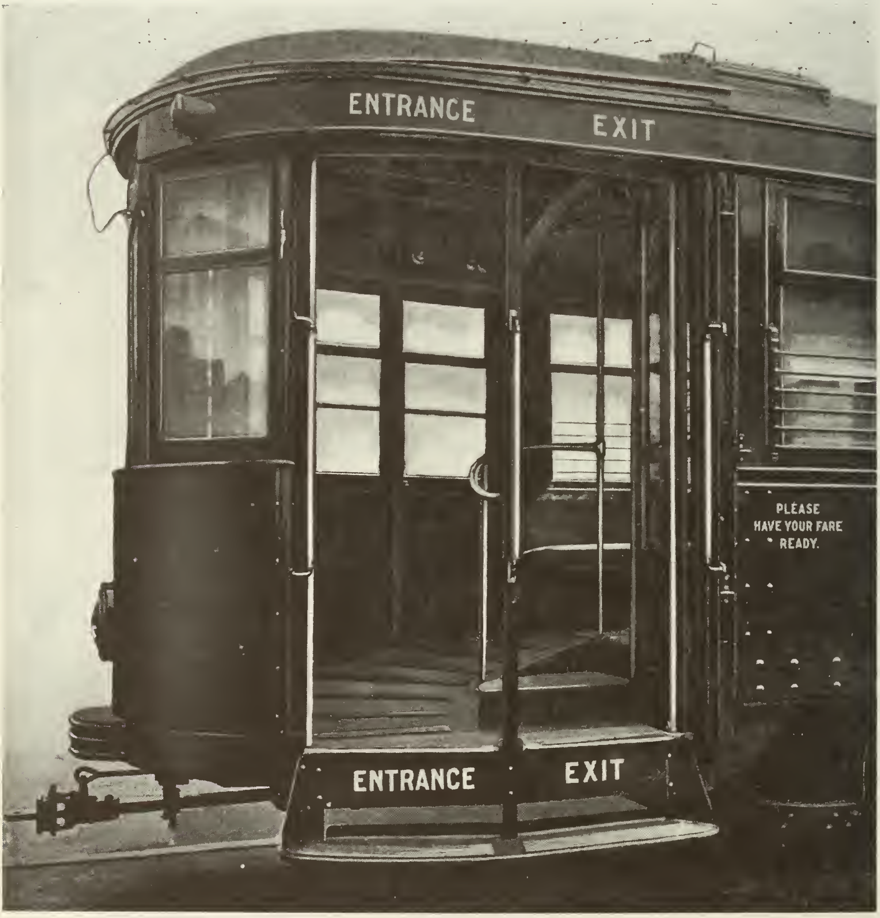
KANSAS CITY TRAFFIC CONDITIONS AND CARS. Standard closed car of the Kansas City Railway & Light Company, adopted in 1910, with some features added last year. Single-end operation

10.875 per cent. As the map shows, the city railways converge in the central district in an area comprising about one square mile; from this district they extend south and west in long, straight lines through regularly laid-out streets and north across the Kansas River into the separate municipality of the same name. There are no lines crossing the Missouri River, as the land on the other side is low and subject to inundation. The principal business thoroughfares are Main and Walnut Streets and Grand Avenue, where the heaviest street car traffic occurs. The number of revenue passengers carried in 1911 was 119,351,881; number of transfer passengers, 49,565,500; car mileage, 23,113,795.

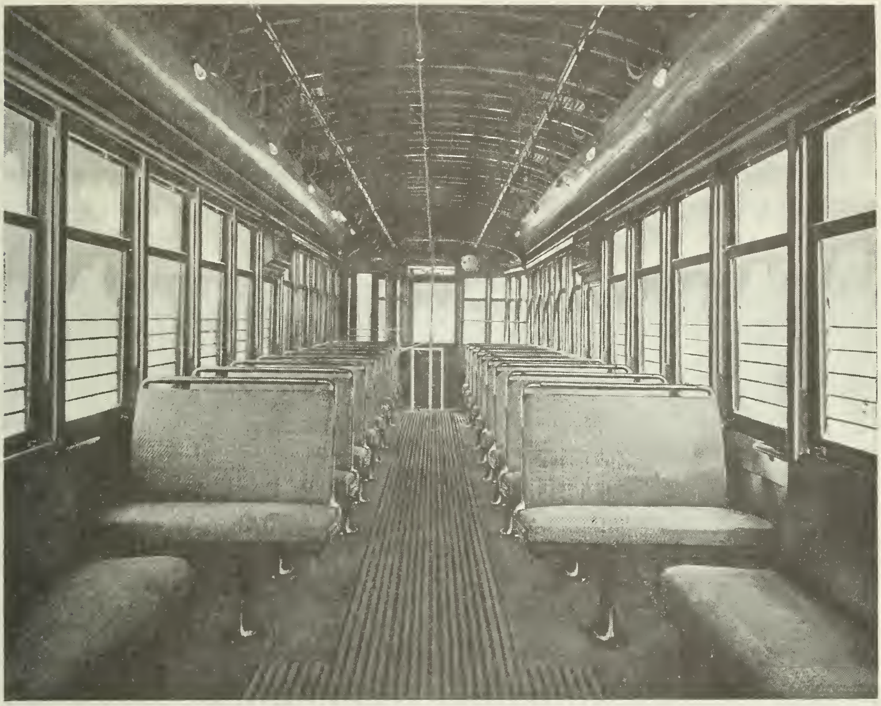
The standard type of car of the Kansas City Railway & Light Company was adopted in 1910, with some features added last year. One of the latest cars is shown in the accompanying photographs, and has three distinct features aside from other important details which make it a very satisfactory car for the requirements of the system and a remarkably interesting type. The first of these features is the seating arrangement, which accommodates 53 passengers by extending the longitudinal seats at the forward end beyond the body corner posts, at one side to the motorman's cab and at the other side to the front exit. The second feature is the location of the conductor's position



KANSAS CITY TRAFFIC CONDITIONS AND CARS. Floor plan of standard car. *Reproduced by permission of Electric Railway Journal* within the curve at the rear of the entrance and elevated to the height of the main floor. From this point he has a complete view of the interior of the car and at the same time is able to observe the movements of incoming and outgoing passengers and also of persons approaching the entrance from the front or rear, thereby precluding accidents. The third feature is the unusually low step obtained by the low dropped platform permitted by a ramp to the car floor. The rear vestibule has one set of double-folding



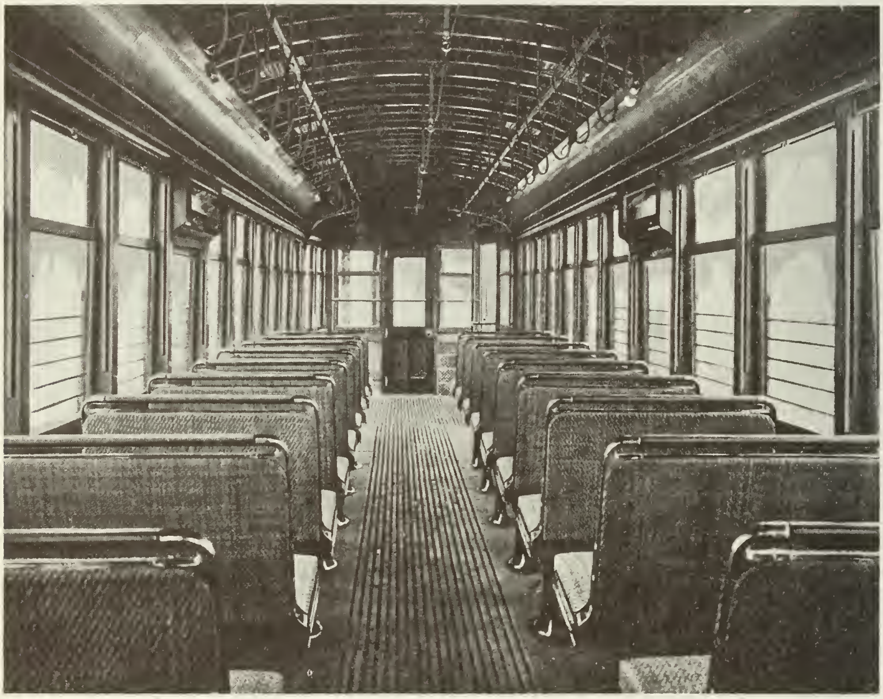
KANSAS CITY TRAFFIC CONDITIONS AND CARS. Ramp on rear platform rises 12 in. from platform to floor of carbody. Hand railing extends from step all the way in to the carbody



KANSAS CITY TRAFFIC CONDITIONS AND CARS. Looking rearward. The plain arch roof and omission of headlining saves considerable weight

exit doors and one two-part sliding entrance door, both of which are manually operated by the conductor. The ramp has an easy inclination and rises 12 in. between the floor at the entrance door and the main floor of the car; safety treads provide a secure foothold, and handrails at both sides of this passageway give passengers a convenient place to sieze with either hand and are from the outside step all the way in to the carbody. Other details of the entrance and the two exits are clearly shown in the diagram and photographs. The motorman's cab partition is glazed in the upper part, giving the operator a clear view in all directions. The front exit door is of the single sliding type, and operated from the cab.

These cars are built on composite underframes, the side sills being of yellow pine plated on the outside with 32 by 3/16-in. steel plate, which plate forms the side wall of the carbody and makes the use of inside and under trusses unnecessary. The end sills and crossings are of oak reinforced with steel angles and plates. The platforms are supported on the step side with 7-in. steel channels and on the closed side by 42 by $^3/_{16}$-in. steel plates which form the outside sheathing of the vestibules; these wide steel plates are spliced to the carbody, thereby dispensing with the usual underframe knee at this point and saving weight. The two center platform knees are of 4 by 3 by $\frac{3}{8}$-in. steel angles. The general dimensions will be found on the floor plan diagram on page 231. Height from bottom of sill to top of roof, 8 ft. 9¾ in.; from rail to sills, 2 ft. 9¼ in.; bolster centers, 21 ft. 10 in.; truck wheel base, 4 ft. 10 in.; diameter of wheels, 34 in.; weight of car and trucks ready for operation, 47,300 lb.



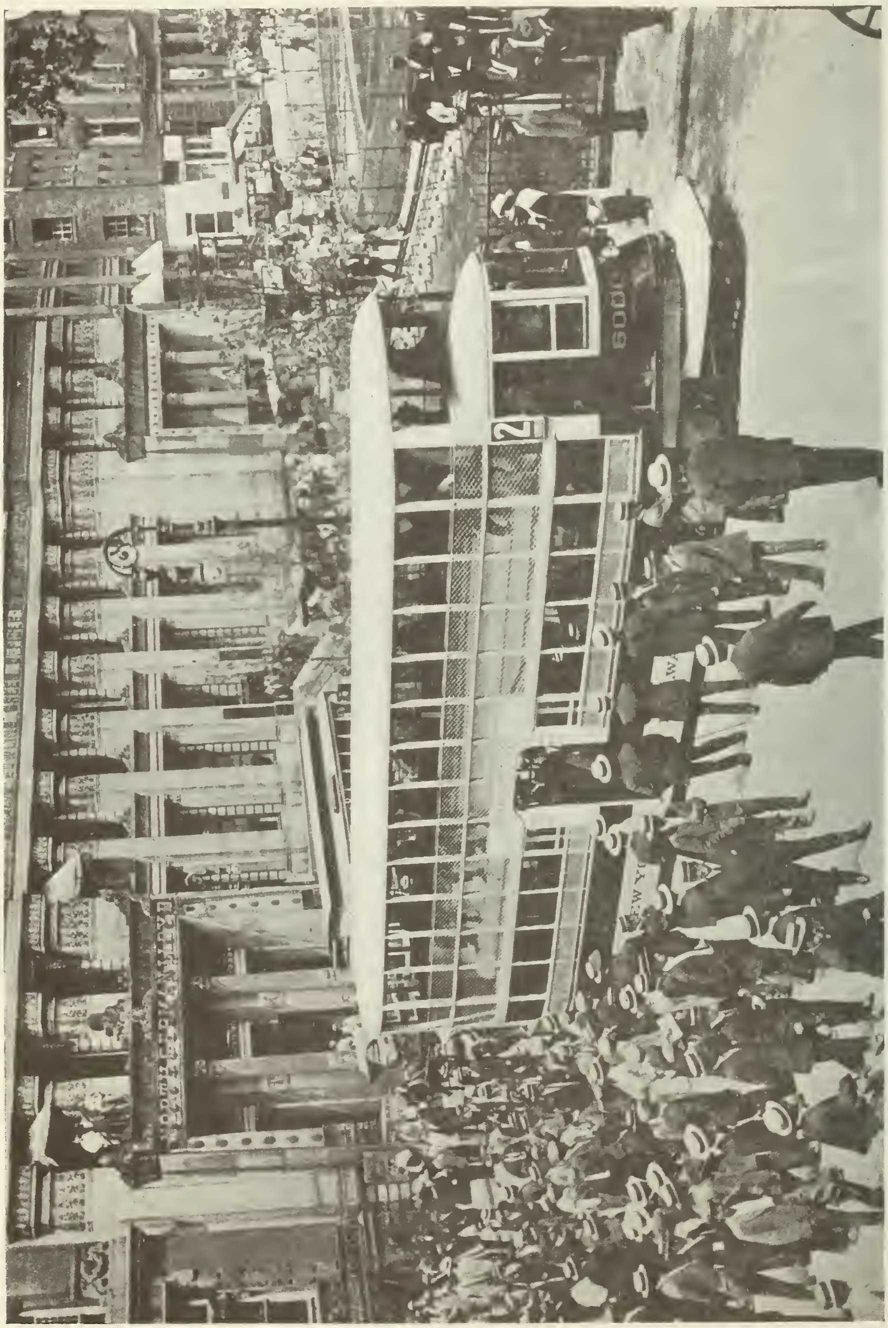
KANSAS CITY TRAFFIC CONDITIONS AND CARS. Looking forward towards the motorman's cab

THE NEW YORK DOUBLE-DECK CAR

CENTER-ENTRANCE STEPLESS TYPE

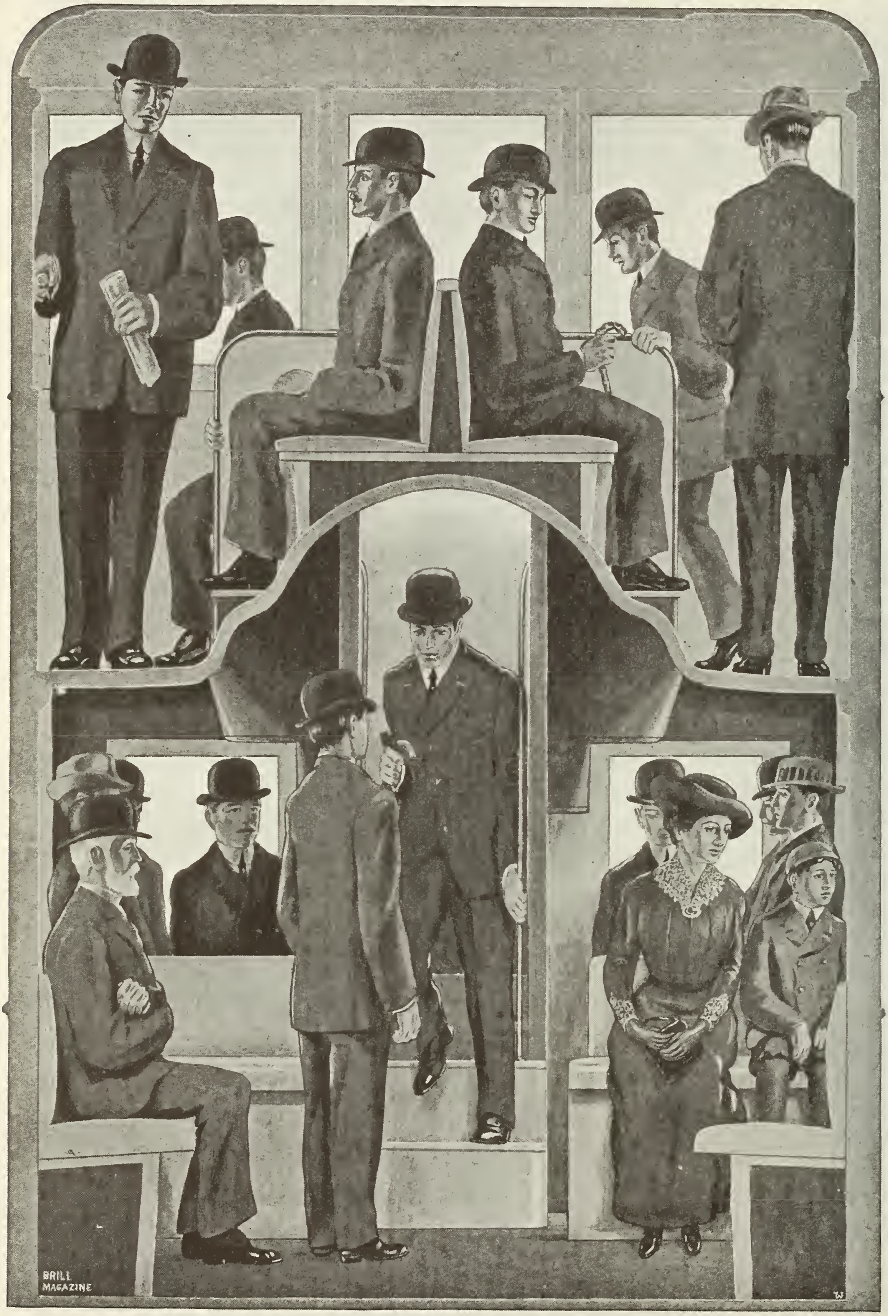
THE New York Railways Company has received from The J. G. Brill Company a double-deck car of the Center-Entrance Stepless type developed by Mr. Frank Hedley, general manager, and Mr. J. S. Doyle, superintendent of car equipment, and the car was given its trial trip on August 14th on the Broadway lines. The lower part of the car, including the trucks, is similar to the car which was described in the March issue of BRILL MAGAZINE, the difference being the cabs at each end are slightly longer, the seating arrangement is mainly of longitudinal seats, and a stairway is provided at each end. The upper deck, equal in its seating capacity to the lower deck, has been secured within the remarkably low height over all of 12 ft. 10 in., only 18⅝ in. above the former standard car of the system and making it practicable to operate under the elevated railways and giving sufficient clearance for any other overhead construction on practically the entire system. The complete success of the single-deck car of this type assures the company of the success of the double-deck car, as none of the advantages of the single-deck car are sacrificed, and doubling the carrying capacity and the attractive features of the upper deck arrangement cannot fail to appeal to the public and everyone having to do with the street railway traffic situation in the Metropolis.

Of chief importance is the double carrying capacity of the car; actually 88 seated passengers and 83 standing passengers can be accommodated, giving a total of 171, making it possible to double the capacity of the lines where the greatest congestion occurs without increasing the congestion. The simile of the "neck of the bottle" in reference to the street railway transportation problem of all large cities is peculiarly applicable to New York with its narrow configuration and practi-

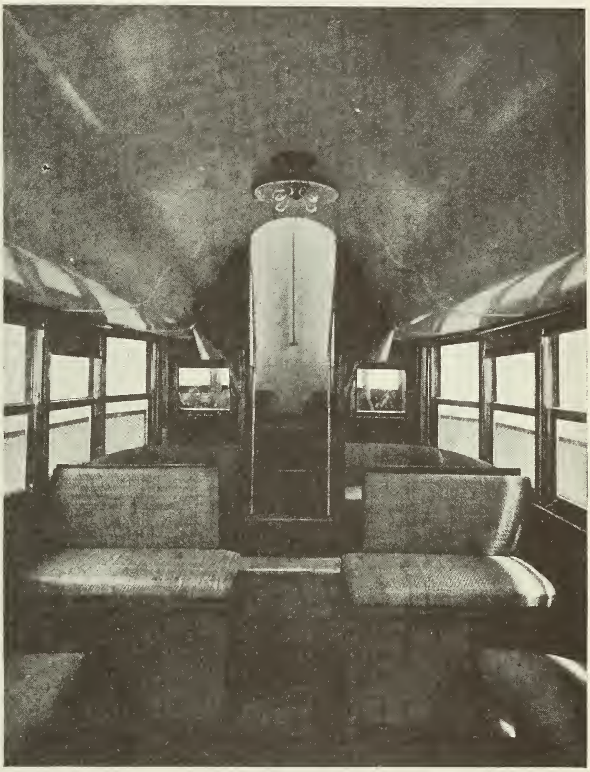


THE NEW YORK DOUBLE-DECK CAR. The car turning at the lower end of Broadway on its trial trip, August 14 *Copyright, American Press Association* cally all traffic moving in one direction. The physical limitations of certain traffic points when reached have heretofore been met by constructing subways and elevated lines, but the double-deck car introduces a new factor for solving the transportation problem and one that eliminates the heavy cost of the other two. The concentration of great business interests within limited areas, especially the grouping of office buildings and of great department stores cannot be avoided, nor can the morning and evening periods of transportation be extended; in fact, the tendency is rather to open and close all classes of business nearer the same hour, and this is true of all large cities, necessitating a concentration of cars in these districts.

Aside from the prohibitive height, double-deck cars heretofore have been unable to keep their place on the lines owing to slowness in loading and unloading. This appears to be entirely overcome in the Center-Entrance Stepless type, first, by the floor at the entrance being close to the pavement; second, by facilitating the prepayment method of fare collection by providing the conductor with a change desk, and, third, by having the stairs to the upper deck at the ends of the car and thereby getting the passengers, who intend going to the upper deck, away from the central section and preventing them from obstructing the movement of other passengers. As the conductor is elevated in his seated position at the desk and can look over the heads of standing passengers, he can expedite movement in either direction. He is furnished with a specially designed electrical announcer for apprizing passengers on the upper deck of the names of streets being approached, giving them ample time to descend while the car is still in motion and be near the exit door when the car is brought to a stop. An important advantage over former types of double-deck cars is in the fact that when the car is full a "Car Full" sign can be displayed, and, with doors closed, it is able to proceed past street corners with no chance

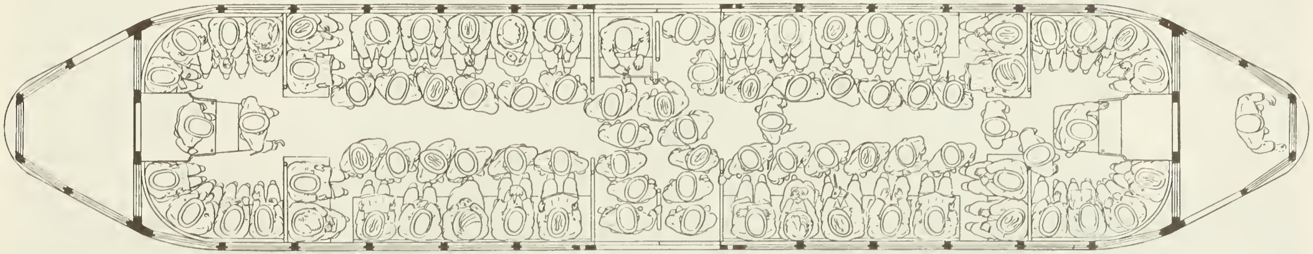


THE NEW YORK DOUBLE-DECK CAR. A stairway at each end of car branches from a midway landing to both sides of the upper deck. Photograph on opposite page explains the corner seat arrangement of the lower compartment of persons attempting to board, as there is absolutely no point at which a foothold can be secured. Every means of reducing congestion at the center entrance, due to the double carrying capacity, has been taken into consideration in the plan and there seems to be no reason why the car should not easily hold its place in the regular running schedule.

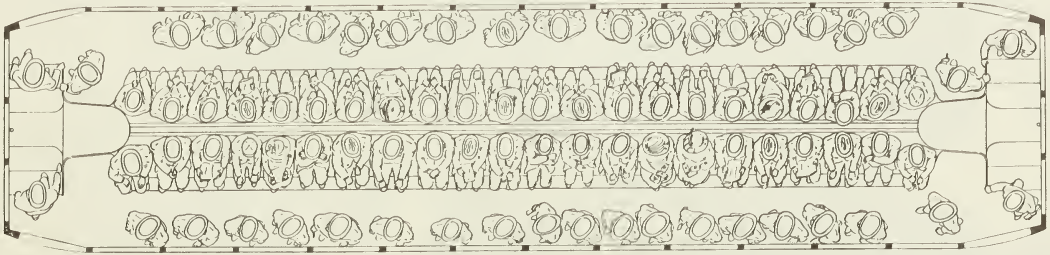


THE NEW YORK DOUBLE-DECK CAR. End of lower compartment, showing the method of utilizing the corner spaces under the stairs for seats

The stairways are very ingeniously arranged to reduce the number of steps and to economize space; from lower floor to upper floor they are but 5 ft. 2 in. high and, moreover, there is a landing half way. They are comfortably wide and provided with handrails to minimize the liability of accidents to passengers while the car is in motion. As the stairs branch to either side of the upper deck, they thereby provide for a larger number passing to and from this deck. A study of the illustrations and diagrams will give a clear idea of the stair arrangement, and they convincingly show the complete realization of the designers of the importance of the stairs to the success of the car.

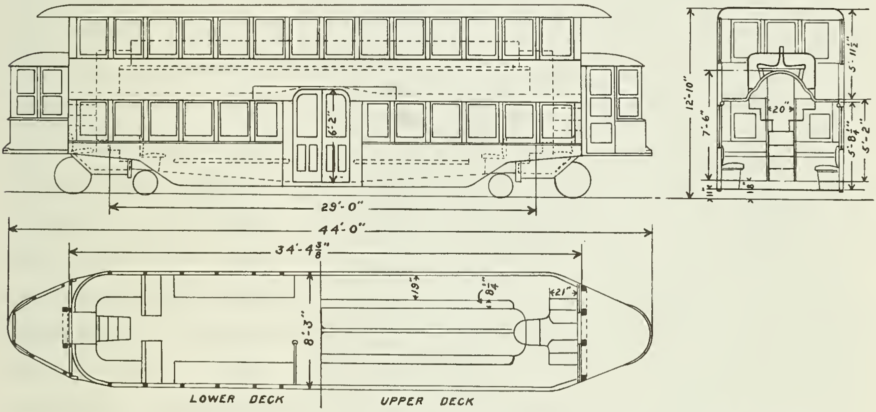


THE NEW YORK DOUBLE-DECK CAR. Bird's-eye view of lower compartment showing 44 passengers seated, of which 28 occupy longitudinal seats, 8 face forward and 8 face backward; 42 passengers are shown standing and on the stairways



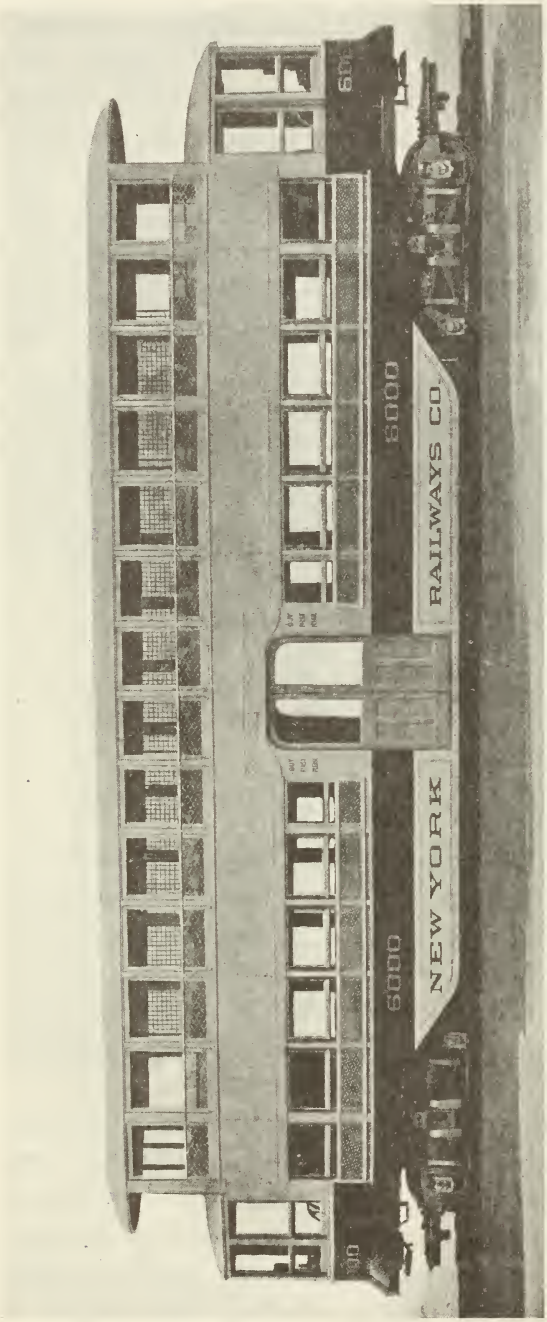
THE NEW YORK DOUBLE-DECK CAR. Bird's-eye view of upper compartment showing 44 passengers seated and 41 standing and on the stairways. Total seating capacity of both compartments, 88; total standing passengers shown above, 83; grand total, 171

It is intended to have the upper compartment entirely open at the sides by removing the sashes and panels and leaving the high wire screens for protection during seven months of the year. It is reasonable to expect that a large class of riders will prefer this compartment, as smoking will be permitted and its height and openness will increase the pleasure of riding. The windows in the lower deck are removable and the compartment thereby made comfortable during the warm season. Ventilation of both compartments during the cold weather, when the windows are closed, is secured by a motor-driven exhaust fan which produces a suction pressure throughout a duct system and creates a partial vacuum in the car interior which causes a flow of fresh air over the heaters. This system provides a minimum of 350 cubic feet of fresh air per hour per passenger, and a thermostatic heat regulator keeps the atmosphere at a uniform temperature.



The New York Double-deck Car. Side and end elevations and floor plans of both compartments, with general dimensions

The operating devices for controlling the car and doors have been described in connection with the single-deck Stepless type. A novel feature in the double-deck car is a method for automatically providing a graduated increase or decrease in braking power by the varying passenger load, enabling the motorman to make all stops, whether with light or

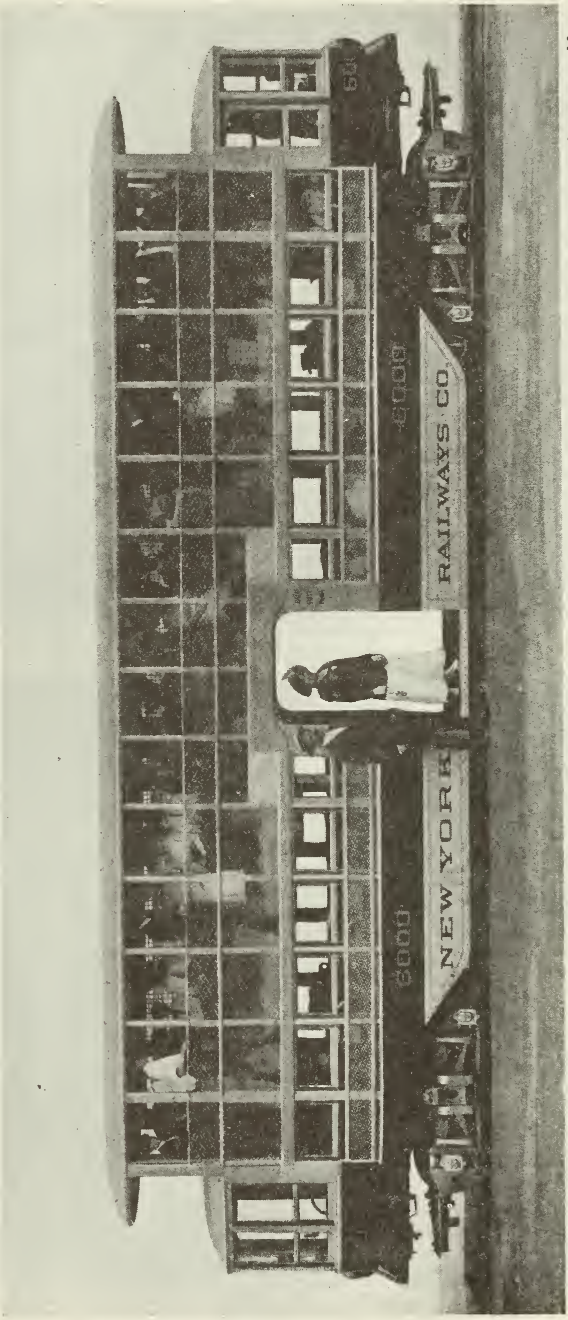


THE NEW YORK DOUBLE-DECK CAR. The car closed and ready for winter service. Fenders and truck guards are shown in photograph on page 236

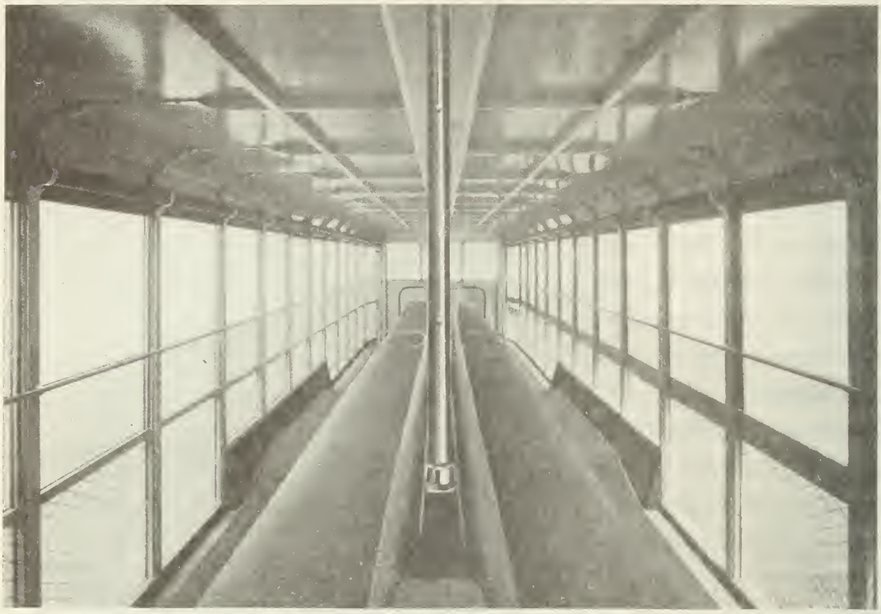
heavy load, with equal facility, and shortening the time consumed at stops when the car is carrying a full pasger load. The fender is of an interesting construction and is attached to the end frame of the truck; it extends well beyond the truck and has a tripping gate under the front edge, with a slat fender but 3 in. from the pavement just in front of the truck wheels. The fender is connected to the master controller "dead man's" handle, and in case of emergency the motorman, by straightening his fingers or releasing his grip on the controller handle, instantly shuts off the current, applies the brakes and drops the lower fender on the truck. The emergency power action of the brakes will bring the car to a stop in a short distance.

The increase of 18 in. in the length of the cab has been accompanied by a decrease in width, as the ends of the car have been drawn into a sharper point in order to eliminate absolutely the overhang outside of the rails at the ends of the car when passing around sharp curves. This is a feature peculiar to the first stepless car which was found to be so desirable that it was carried still further in the double-deck design.

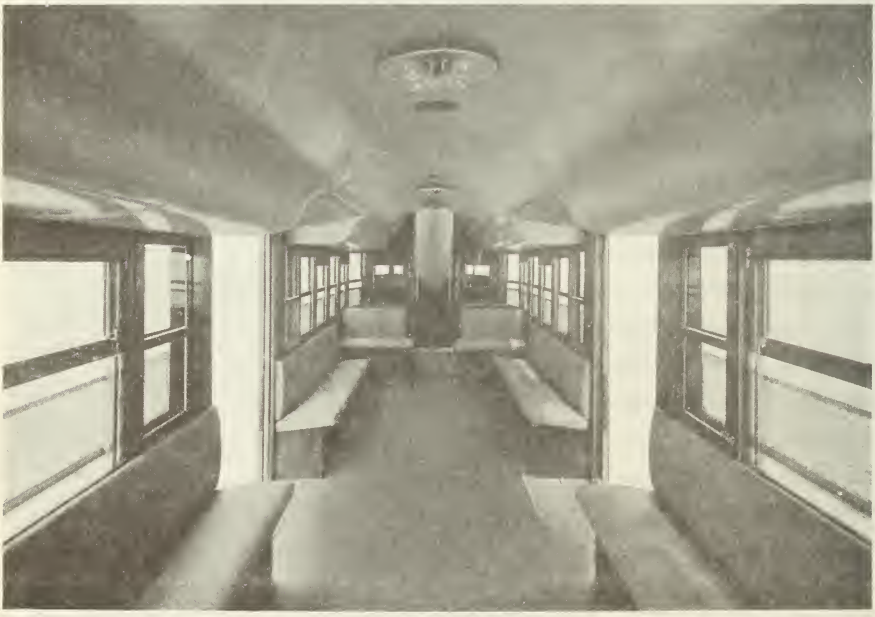
Like the original stepless car, the new type is unusually easy-riding. No swaying such as might be ex-



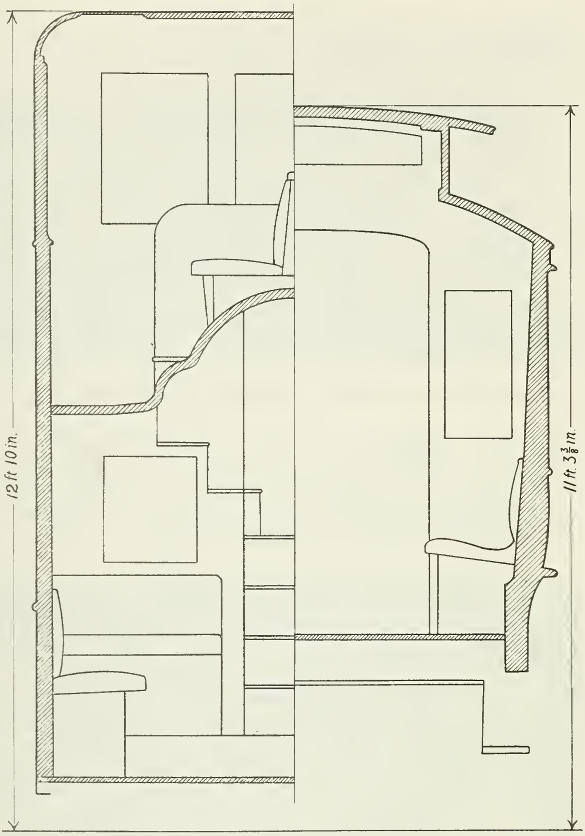
THE NEW YORK DOUBLE-DECK CAR. Sashes and panels removed from upper compartment. The sashes in the lower compartment are also removable



THE NEW YORK DOUBLE-DECK CAR. Interior of upper compartment with sides open for summer service



THE NEW YORK DOUBLE-DECK CAR. Interior of lower compartment. A motor-driven fan exhausts the vitiated air through a system of ducts in both upper and lower compartment



The New York Double-Deck Car. Comparative heights of double-deck car and ordinary type of car of the New York Railways Co., shown in divided cross section

pected to occur on account of the height is apparent on the upper deck, and the rigidity at this point will undoubtedly relieve any fears of passengers as to the car's stability. As a matter of fact, the over-all height of the car, 12 ft. 10 in., is hardly more than that of most interurban cars and is less than the height of many passenger coaches on steam railroads. The center of gravity is actually lower than it is in many such cars and the center seats of the upper deck exert a marked tendency toward maintaining the car in stable equilibrium.

The total weight of the car, completely equipped, is 46,000 lb., and on the basis of 88 seated passengers the weight per seat is 522 lb.

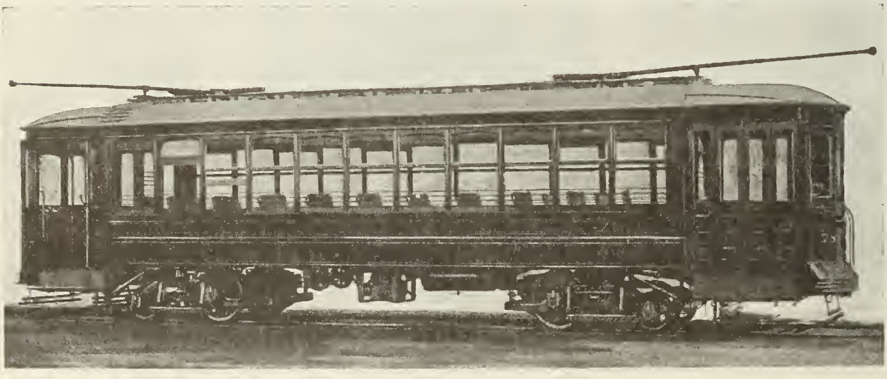
The total standing and seating capacity has been found by actual experiment to reach the high figure of 171 passengers, and on this basis the weight per passenger carried standing and seated is 266 lb. The weight per foot of length is 1045 lb.

MORE SEMI-CONVERTIBLE P-A-Y-E CARS FOR READING, PENNA.

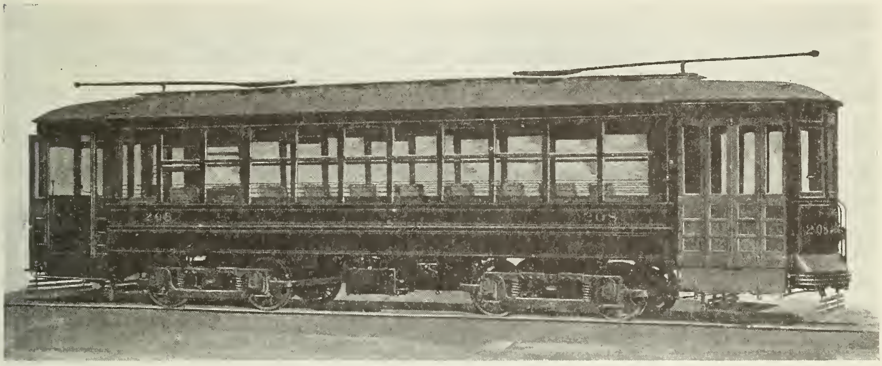
STEEL UNDERFRAMES

THE J. G. Brill Company recently shipped to the Reading Transit Company, Reading, Pa., 20 semi-convertible pay-as-you-enter cars, 10 mounted on Brill high-speed trucks of the No. 27-MCB type for suburban service and 10 mounted on Brill single-motor trucks of the No. 39-E type for city service. The latter cars are identical to a lot of six delivered several months ago, which type has been made the standard car of the company. They are built with stationary railings on the platforms and have single entrance and exit doors which slide into central bulkheads in the body ends; the cars for suburban service are practically of the same design as those for city service, except that, although they include pay-as-you-enter principles and have bulkheads in the body ends for sliding doors, the platform railings and sliding doors are omitted, and they are mounted on high-speed trucks.

The platforms are 6 ft. 6 in. long and have a pipe stanchion separating the entrance and exit and extending from

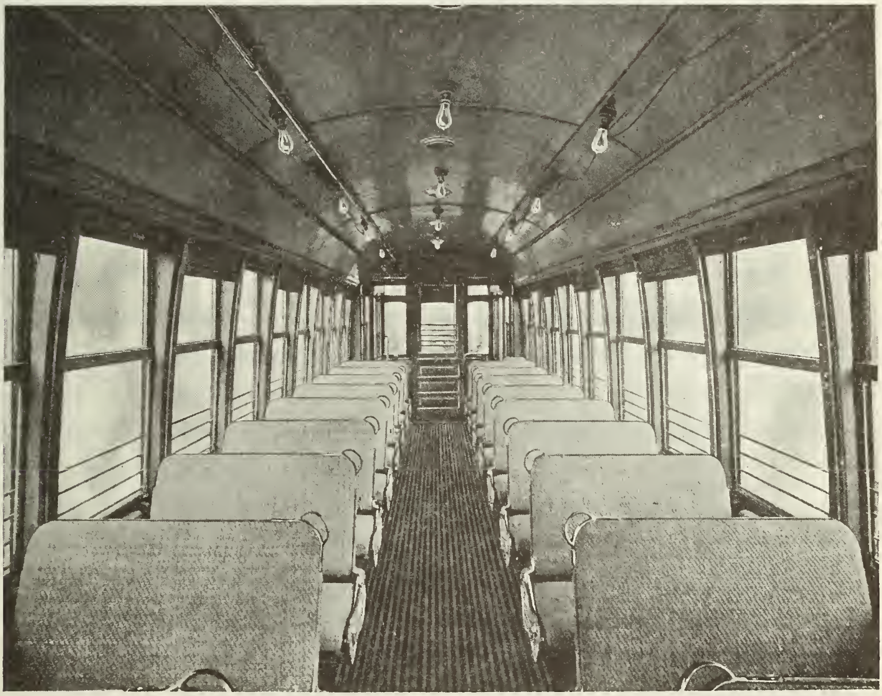


Cars for Reading. Standard semi-convertible city car of the system, mounted on Brill No. 39-E trucks



Cars for Reading. Standard semi-convertible suburban car of the system, mounted on Brill No. 27-MCB trucks

the floor to the roof; four-part doors in two sections are provided, one section folding back against the body end and the other against the vestibule. These doors operate in conjunction



Cars for Reading. Seats are of Brill "Winner" type and give a seating capacity of 42; width of aisle, 25 in.

with a single folding step at each opening and are operated from a lever on the platform. Nine 36-in. transverse seats of the Brill "Winner" type, located on each side of the aisle, with stationary single seats at diagonal corners on the entrance side of the car body and single stationary and folding seats at the opposite corners, give the cars a seating capacity of 42. The omission of wall pockets in these cars with the Brill semi-convertible window system enables the seats to be placed close to the walls, thereby allowing the aisle to be 25 inches wide. The interiors are handsomely finished in cherry, and the ceilings of poplar, painted robin's-egg blue. The alarm gongs, signal bells, sand boxes and other items of equipment are of the builder's manufacture.

The bottom frames are built completely of steel and consist of side sills of 18 by 3/16-in. steel plate, reinforced at the top with 3 by ½-in. plate and at the bottom with 2½ by 2½ by ⅜-in. angle; end sills of 10-in. channel; two center stringers of 4-in. channel; crossings of 5-in. channel in open truss form, securely attached to the side sills by substantial gusset plates. The platforms are supported on two skeleton knees of 4-in. channels. The upper framing consists of corner posts 3⅝ in. thick, and side posts 2 15/16 in. thick, of straight-grained white ash; sweep of posts, 1¾ in. The concave and convex panels are of No. 12 sheet steel.

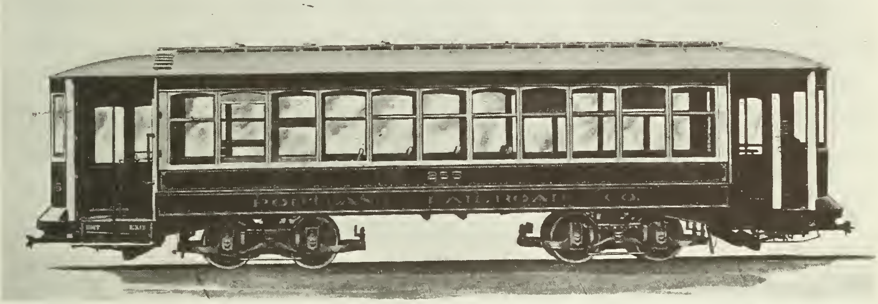
The principal dimensions and weights of the city cars are as follows:

Length over corner posts	30 ft. 8 in.	Type of trucks	Brill No. 39-E
Length over platforms	43 ft. 8 in.	Wheel base	4 ft. 6 in.
Length of platforms	6 ft. 6 in.	Diameter of wheels	33 in. and 21 in.
Centers of side posts	2 ft. 8 in.	Size of journal	3¾ in.
Width over sills	8 ft. 1½ in.	Type of motors	West. 305—2-40 hp.
Width over posts	8 ft. 5 in.	Weight of car body less electrical equipment	18,730 lb.
From track to side sills	2 ft. 7¾ in.		
From top of floor over roof	7 ft. 11⅜ in.	Weight of electrical equip.	1,400 lb.
Track to step	17⅜ in.	Wt. of air brake equipment	1,500 lb.
Step to platform	13 in.	Weight of trucks	10,600 lb.
Platform to floor	8¼ in.	Weight of motors	5,650 lb.
Seating capacity	42	Total weight	37,880 lb.

BRILL SEMI-CONVERTIBLE CARS FOR PORTLAND, ME.

BRILL PLAIN ARCH ROOF

THAT the Brill semi-convertible car is the best car for lines where some very cool days are experienced during the summer season has been demonstrated on the lines of the Portland Railroad Company. This type of window system has been used on the cars of this road for a number of years, and the purchase of a number of additional cars of this type a short time ago from the Wason Manufacturing Company speaks well for its popularity in Portland. The Portland Railroad Company operates all of the street railways in Portland and connects the city with many outlying towns, having a trackage of about 105 miles.



CARS FOR PORTLAND. Window system of Brill semi-convertible type. Constructed with Brill Plain Arch roof and mounted on Brill No. 27-GE1 trucks. Seating capacity, 42

The new cars are constructed with the Brill Plain Arch roof and in this they are different from the former cars; they are mounted on Brill No. 27-GE1 trucks. The 6-ft. platforms are equipped with standard P-A-Y-E railings; on the controller side of the platform is a pipe stanchion which, besides dividing the platform into entrance and exit, serves as a grab handle. This side of the platform is provided with double doors, folding back against the controller and held in position, when open, by catches at top and bottom. When the doors are closed they are kept securely shut by a locking bar, the operation of which opens and folds the single step. On the opposite side of the platform is a single exit door which slides along the outside of the lining sash when operated by a lever from the motorman's position on the platform. This door jointly operates the step, being connected to the step mechanism by an iron bar attached to the outside which can be plainly seen in the photograph. The vestibules have three windows in the upper part, the center sash being arranged to be held at various heights and the two side sashes to drop into pockets. The body ends are provided with entrance and exit doors which slide into a central bulkhead; the exit door is operated by a lever located on the lower bulkhead panel. The seating arrangement in the cars differ. Several have five transverse seats on each side of the aisle, with longitudinal seats, accommodating five passengers each, in the corners by the body entrance doors and longitudinal seats in the opposite corners divided into two sections, a single seat near the exit door being arranged to raise; the combined seating capacity of these two sections is six, giving the cars a total seating capacity of 42. Others have seven transverse seats on each side of the aisle, with longitudinal seats, accommodating three passengers each, in the corners by the body entrance doors and longitudinal seats in opposite corners divided into two sections, a single seat by the door being arranged to raise. Four persons can occupy these corner seats, which give the latter cars the same seating capacity as the others. The interiors are handsomely finished in mahogany, with ceilings of decorated quartered oak veneer.

The underframing consists of yellow pine side sills, 4 by 7¾ in., reinforced with 15 by ⅜ in. steel plate; end sills of oak, 5¼ by 6⅞ in., with oak crossings. Corner posts, 3⅝ in. thick, and side posts, 2¼ in. thick, of straight-grained white ash, comprise the upper framing; sweep of posts, 1¾ in.

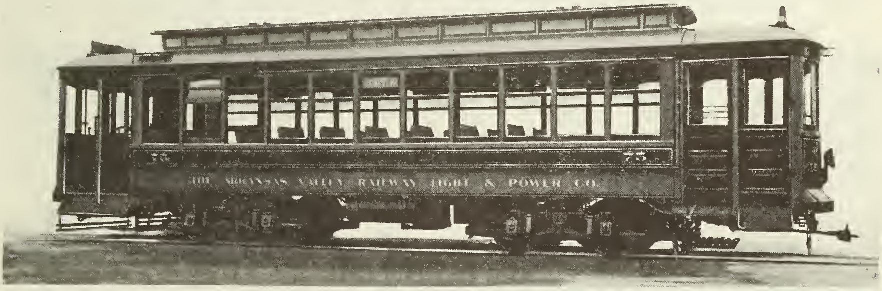
The roofs of the cars are strengthened with concealed steel rafters, forged to shape, placed so as to relieve the strain of the trolley apparatus.

Length over corner posts	30 ft. 8 in.	Floor to center of headlining	8 ft. 0⅜ in.
Length over platforms	42 ft. 8 in	From track to step	16½ in.
Length of platforms	6 ft. 0 in.	From step to platform	14½ in.
Centers of side posts	2 ft. 8 in.	From platform to floor	8½ in.
Width over sills	7 ft. 0½ in.	Seating capacity	42
Width over posts	8 ft. 1 in.	Type of trucks	Brill No. 27-GE1
Extreme width	8 ft. 2 in.	Wheel base	4 ft. 6 in.
From track to side sills	2 ft. 9¼ in.	Diameter of wheels	33 in.
From side sills over trolley boards	9 ft. 2 13/16 in.	Weight of car body, less electrical equipment	30,750 lb.

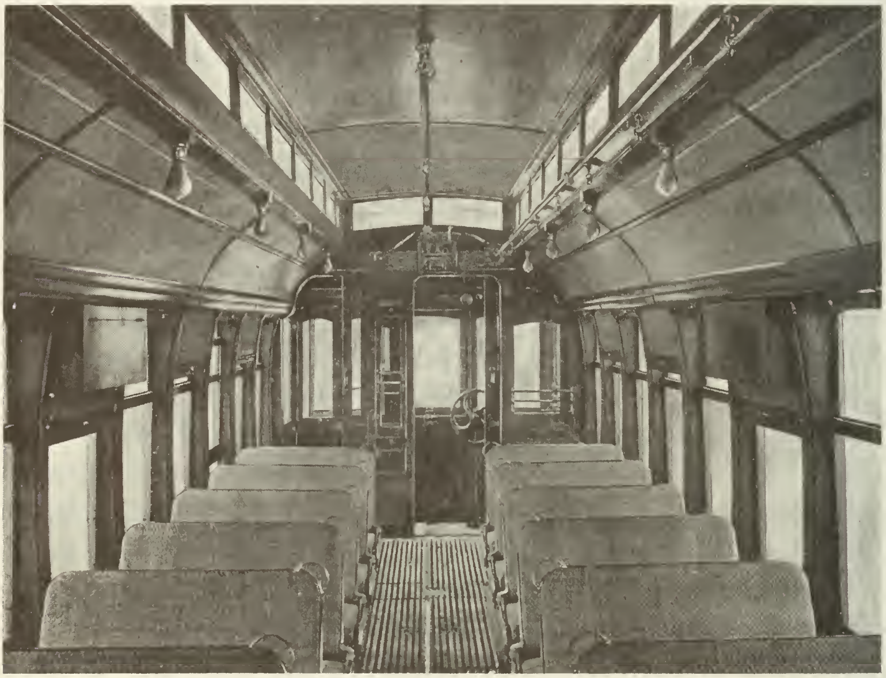
PAY-AS-YOU-ENTER CARS FOR PUEBLO, COL.

DOUBLE-END OPERATION

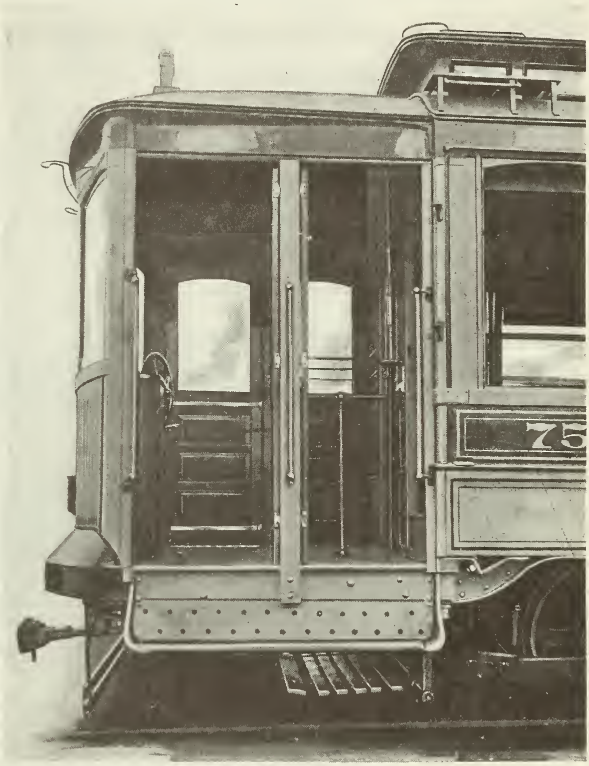
THE operation of the pay-as-you-enter system in Pueblo, Colorado, began recently when six cars of the Brill semi-convertible type with this method of fare collection, ordered from the American Car Company, were placed



CARS FOR PUEBLO. Cars are constructed with Brill semi-convertible window system and mounted on Brill No. 27-GE1 trucks in service by the Arkansas Valley Railway, Light & Power Company. This company operates 30 miles of track in Pueblo, controlling all the street railway lines of the city. The new cars are in operation on the principal residence lines running through the shopping district, one of which terminates at Lake Minnoqua Park, an amusement park owned by the company. Formerly, on account of the weather conditions, open cars, or partly open cars, were in operation practically the whole year round, but these new cars, having the Brill semi-convertible window system, in which the sashes are raised into roof pockets, are filling the requirements of the climate in a more satisfactory manner. The heaviest traffic of the lines is experienced during the summer months, in the evening, when the cars are used for carrying large crowds to



Cars for Pueblo. Body exit door is of the telescoping type, enabling the door opening to be close to platform step. Seats are of Brill "Winner" type and accommodate 40 passengers the amusement park. The quicker and more efficient manner in which these crowds, as well as those of the morning and evening rush-hour periods, have been handled is evidence of the success of the pay-as-you-enter cars in Pueblo. Another feature of the cars, which has just been introduced in this city, is that they can be operated at both ends, which enables them to be used where the former equipment could not, although most of the lines have loop ends. The platforms are 6 ft. in length and each are provided with both entrance and exit openings. On the right side of the motorman's position is a single sliding door used for exit, which slides mechanically into a pocket when a controlling lever is operated by the motorman. At the right of the conductor's position, the platform is divided into entrance (and this is the only entrance to the car) and exit by a wooden stanchion, to which are hinged a double swinging door in the entrance opening and a single swinging door in the exit opening; both doors swing back and latch to the stationary railing located



Cars for Pueblo. Platforms have standard P-A-Y-E railings and are 6 ft. in length. Door in entrance opening to left of photograph is of the double folding type on each platform; the steps are of the stationary type. An interesting feature of the cars is the manner in which the pockets in the body ends are constructed. The body exit door is of the telescoping type, enabling the door opening to be close to the platform step and gaining room on the platform for entering passengers; the bulkhead is provided with a single curtain. The seats are of the Brill "Winner" type and, in addition to seven transverse seats on each side of the aisle, the cars are provided with stationary longitudinal corner seats, the seats in the corners by the body end exit doors being 34 in. long and seat two passengers, while those in the opposite corners by the body end entrance doors are 5 ft. long and seat four passengers each; these give the car a total seating capacity of 40. The interiors are finished in cherry and the ceilings are of "Galco" board. The side posts are provided with push buttons located out of the reach of children.

The cars are built on composite underframes, which are composed of long-leaf yellow pine side sills, 3½ by 7, reinforced with 15 by ⅜-in. steel plate; white oak end sills 3½ by 8⅝ in., and crossings of the same, 3 by 6 in. Straight-grained white ash corner posts 3¼ in. thick, and side posts 2¼ in. thick, comprise the upper structure; sweep of posts, 1¾ in. They are mounted on trucks of the Brill No. 27-GE1 type, and among the miscellaneous equipment are included a number of patented Brill specialties.

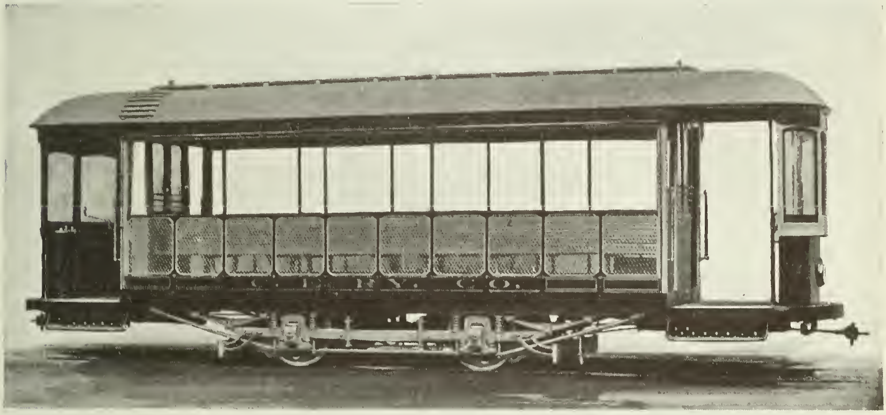
The principal dimensions and weights are as follows:

Length over corner posts . .	28 ft. 10 in.
Length over platforms . .	40 ft. 10 in.
Length of platforms . . .	6 ft. 0 in.
Centers of side posts	2 ft. 6 in.
Width over sills	7 ft. 9½ in.
Width over posts	8 ft. 2 in.
Extreme width	8 ft. 2 in.
From track to side sills . .	2 ft. $9\frac{5}{16}$ in.
From side sills over trolley boards	8 ft. 6¼ in.
From floor to center of headlining	8 ft. 4⅜ in.
Track to step	$17\frac{15}{16}$ in.
Step to platform	13⅛ in.
Platform to floor	9¼ in.
Seating capacity	40
Type of trucks	Brill No. 27-GE1
Wheel base	4 ft. 6 in.
Diameter of wheels	33 in.
Type of motors	GE-203—1

CARS FOR CUMBERLAND, MD.

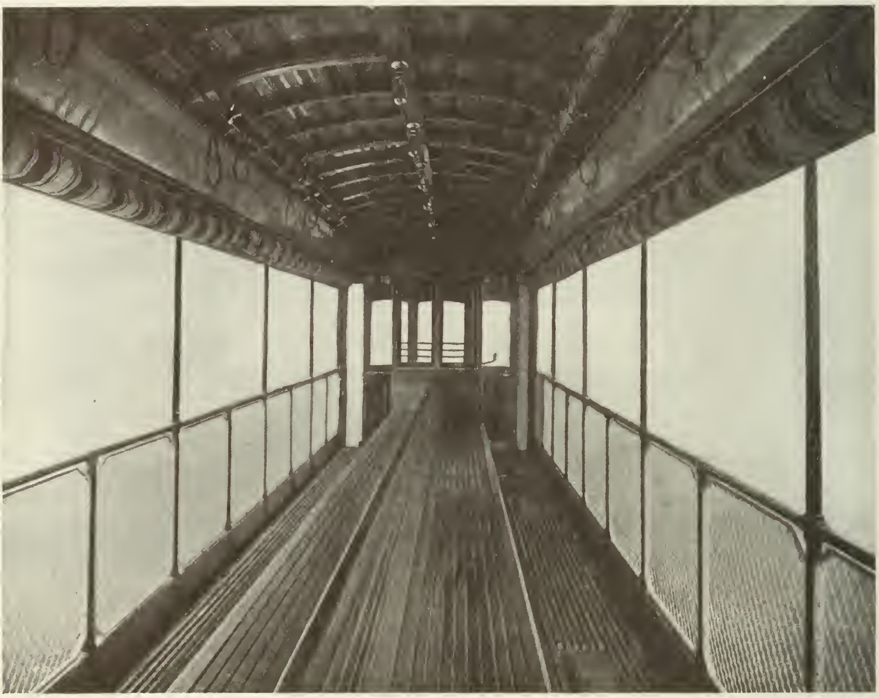
LONGITUDINAL SEATS BACK-TO-BACK

THE Cumberland Electric Railway Company, which operates a 3¼-mile line out of Cumberland, Md., to Narrows Park, a short time ago received three interesting open cars having longitudinal seats and three standard closed motor cars from the J. G. Brill Company. The open cars, which are similar to a lot furnished many years ago, are constructed with plain arch type of roof, which not only adds to the appearance of the cars but affords quite a saving in weight over the monitor deck type, and are mounted on Brill No. 21-E trucks. The sashes in the vestibules, together with those in the bulkheads, drop into pockets. Both body ends are provided with two door openings, but the doors are omitted. Heavy duck curtains in a single section to each side are rolled on a pole let down to the floor. As can be seen in the photograph, the ash slat longitudinal seats are arranged back-to-back; the sections of the seats over the trap doors are removable. The cars are provided with ten sections of wire screen on each side between the upright pipes, extending from the floor up to



Cars for Cumberland. The cars are well-adapted to this scenic line. Mounted on Brill No. 21-E trucks. Sashes in vestibules drop into pockets the arm rail which serves as a support for standing passengers.

The underframes are of wood, consisting of long leaf yellow pine side sills 2⅜ by 3½ in., oak end sills 3½ by 5⅞ in., and oak crossings 3½ by 5½ in. The upper framing consists of straight-grained ash corner posts, 3¾ in. thick, with upright pipes, extending up to the arm rail, as side posts.



CARS FOR CUMBERLAND. Heavy duck curtains in single section to each side are rolled on a pole. Sections of seats over trap-doors are removable; seating capacity, 28

The standard closed cars have 22-ft. bodies and 5-ft. platforms, and are mounted on Brill No. 21-E trucks.

Length over corner posts	22 ft. 0 in.	Wheel base	7 ft. 6 in.
Length over platforms	32 ft. 0 in.	Diameter of wheels	33 in.
Length of platforms	5 ft. 0 in.	Size of journal	3¾ in.
Centers of side posts	2 ft. 1¾ in.	Type of motors	West. 92A—2-35 hp.
Width over sides	7 ft. 6 in.	Weight of car body, less electrical equipment	8,720 lb.
From track to side sills	2 ft. 2⅝ in.		
Track to step	16⅝ in.	Weight of electrical equipment	1,070 lb.
Step to platform	13 in.		
Platform to floor	6⅜ in.	Weight of trucks	5,820 lb.
Seating capacity	28	Weight of motors	4,530 lb.
Type of trucks	Brill No. 21-E		

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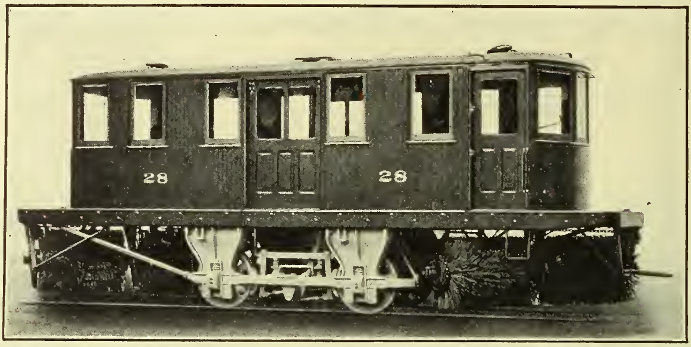

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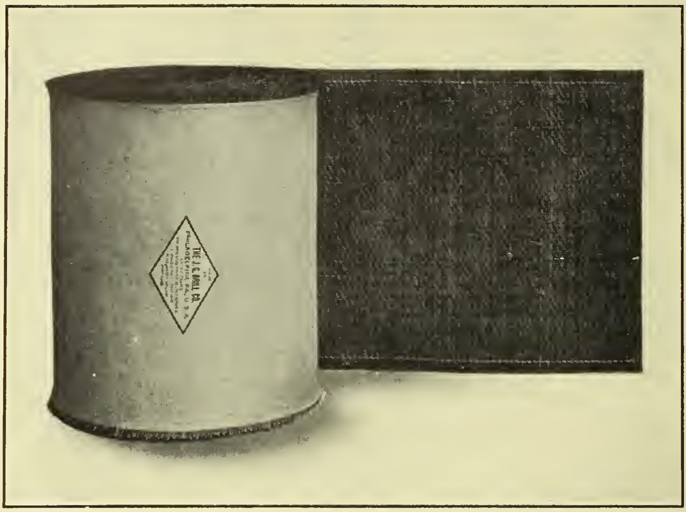
Vol. VI. SEPTEMBER, 1912 No. 9

BRILL MAGAZINE

Rua Assemblea at Avenida Central
Rio de Janeiro, Brazil



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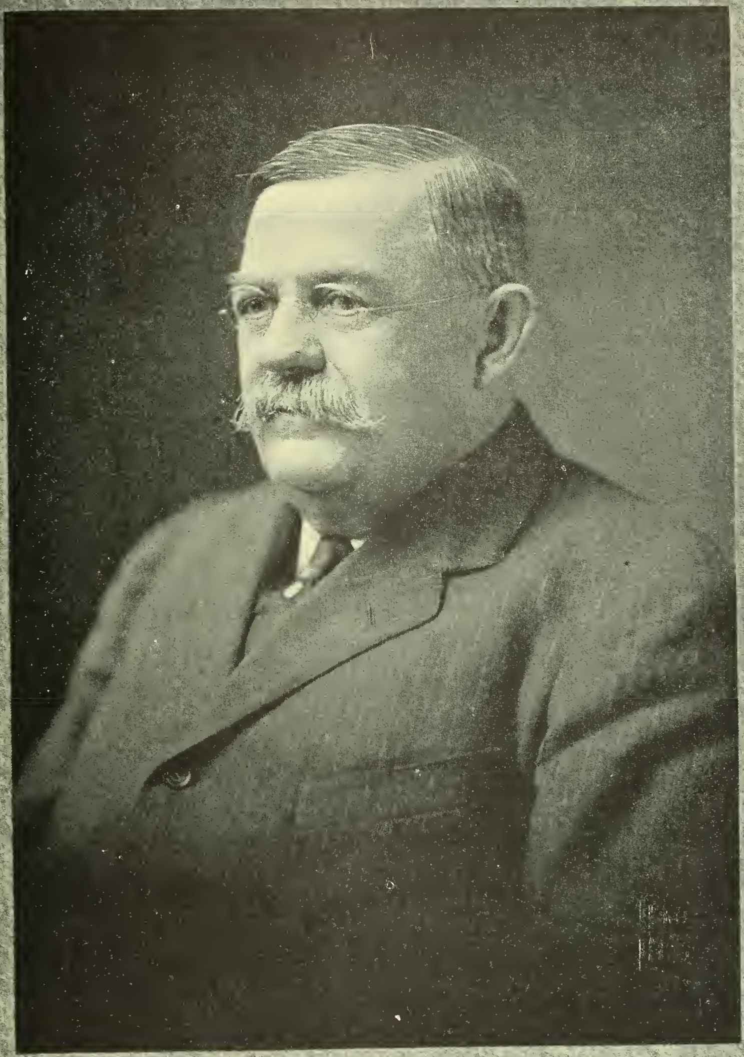

John A Rigg

President, Interstate Railways Company

SUPPLEMENT TO BRILL MAGAZINE
SEPTEMBER, 1912

BRILL MAGAZINE

Vol. VI SEPTEMBER, 1912 No. 9

JOHN A. RIGG

[WITH PORTRAIT INSERT]

JOHN ADAM RIGG, president of the Interstate Railways Company, was born at Reading, Pa., in 1854. He was educated in the public schools of Lancaster County, and at the age of 15 commenced to earn a livelihood. In 1874 he became a conductor on the cars of the Reading City Passenger Railway, and four months later was made superintendent of the system. He soon rose to be general manager, and remained with the company till 1892, when he accepted the offices of vice-president and general manager of the People's Passenger Railway Co., of Philadelphia. Returning to Reading one year later, he, with others, purchased the Reading City Passenger Railway Co., East Reading Railway Co. and Reading & Southwestern Railway Co., and organized them as the Reading Traction Co., of which he was elected president. In 1896 the Reading Traction Co. was leased to the United Traction Co. In 1898 the United Power & Transportation Co. was organized in Philadelphia, with Mr. Rigg as president, and purchased all the Reading properties and those of Lebanon, Norristown, Wilkes-Barre, Wilmington (Del.), Trenton (N. J.), the Chester Traction Co. and the Philadelphia & Delaware County Electric Railway Co. In 1904 the United Power & Transportation Co. was taken over by the Interstate Railways Co., and in 1910 all of the 60 properties were leased through the subsidiary companies in four groups to the following operating companies: Reading Transit Co., Wilkes-Barre Railways Co., Trenton & Mercer County Traction Corporation, Southern Pennsylvania Traction Co. and Wilmington & Philadelphia Traction Co., the two latter companies being operated under one management. The total trackage of these systems amounts to 650 miles.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

RIO DE JANEIRO, BRAZIL*

RIO DE JANEIRO, the capital and metropolis of Brazil, is situated on the western side of the Bay of Rio de Janeiro and has a population of 1,000,000. The larger part of the city stands on low and comparatively level land, with a background of picturesque detached spurs of mountain ranges ending at the entrance to the bay in a conical rock rising 1200 feet above the sea level. These mountains are covered with luxuriant vegetation, except their perpendicular faces and slopes occupied by the suburbs of the city. One of

RIO DE JANEIRO TRAFFIC CONDITIONS AND CARS. Looking north over the city. Since this photograph was made, the splendid shore line boulevard has been completed and the city has developed extensively

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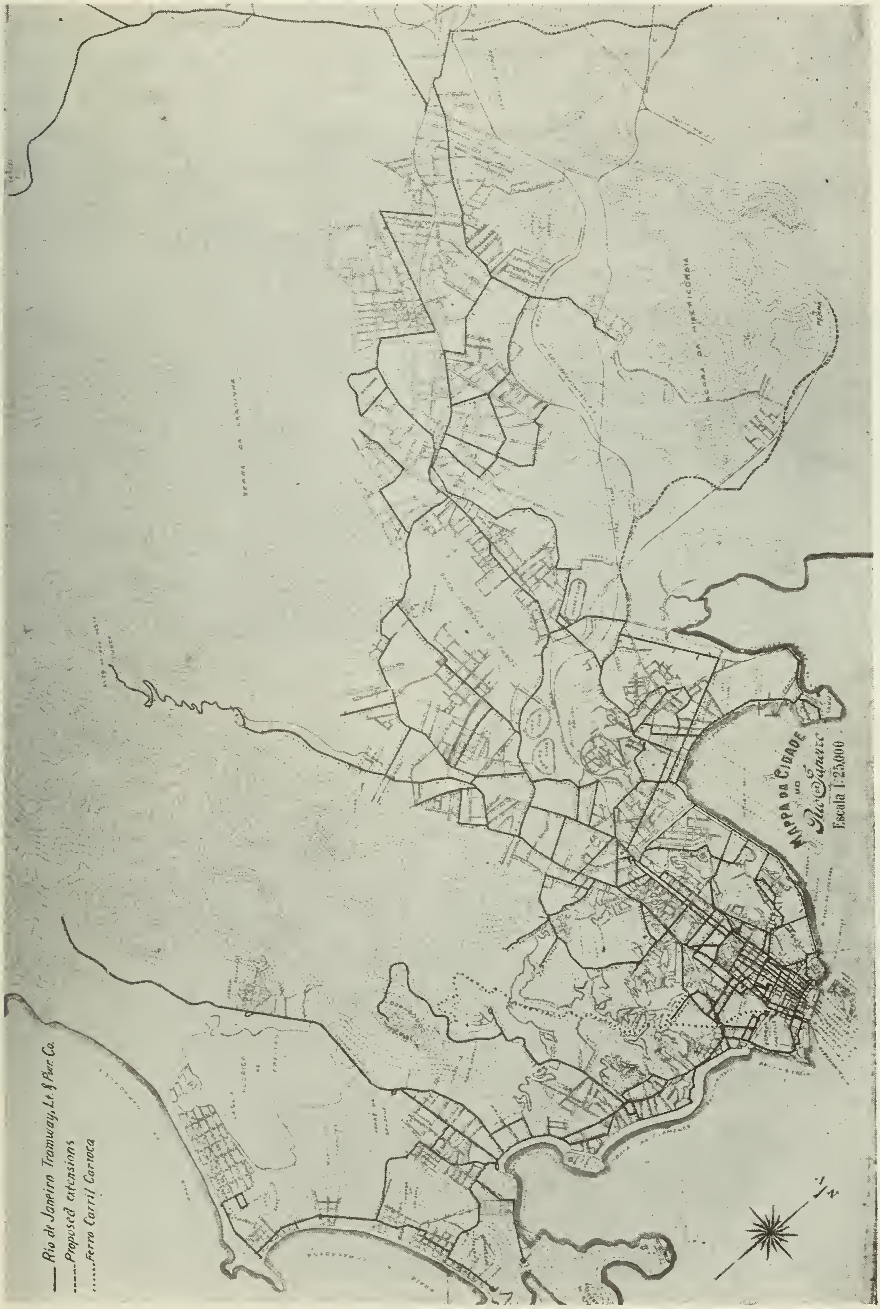
* The forty-fifth article of this series.


Rio de Janeiro Tramway, Lt. & Pwr. Co.
Proposed extensions
Ferro Carril Carioca
Mappa da Cidade do Rio de Janeiro
Escala 1:25,000
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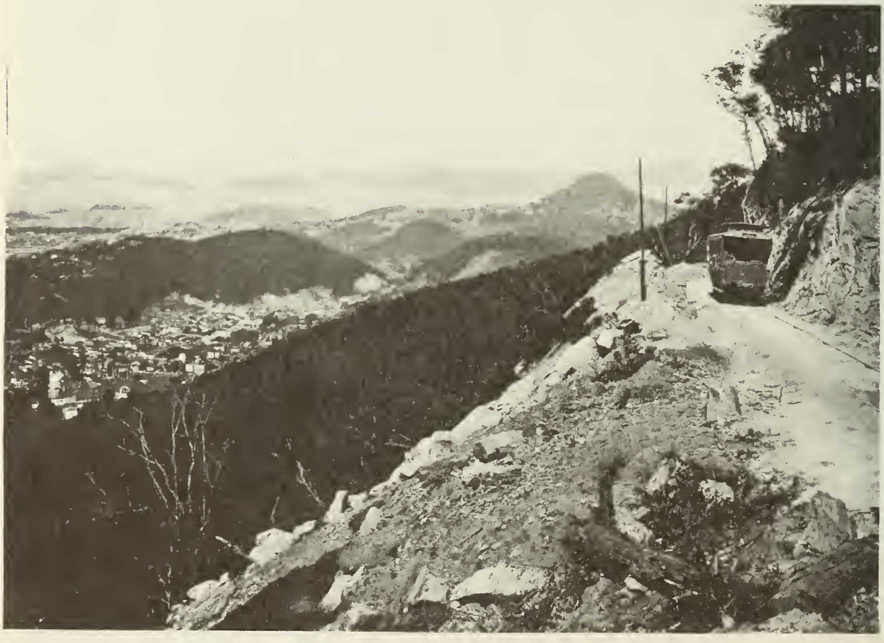
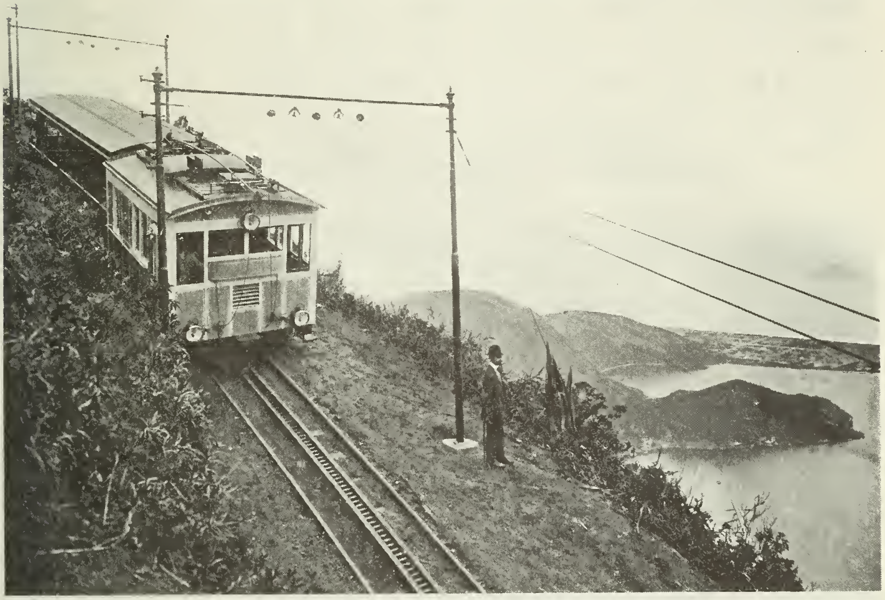
the peaks, about 2500 feet high, overlooks Botafogo, the principal western suburb, where some of the finest residences are located. Several high hills are in the midst of the city and are covered with buildings, and altogether the appearance from the bay and within the city is remarkably picturesque and interesting. The oldest part of the city, which includes the commercial section, extends from the water front inland a considerable distance, and most of the streets, although parallel and crossing at right angles, are narrow and enclose blocks of unequal size. The streets and boulevards in the lower portion are wide and regular, and within the last few years many of the streets in the older portion have been widened and straightened, one of the greatest improvements being a central avenue cut across the old city. A splendid shore line boulevard, about 4½ miles long, has been built and much of the shallow parts of the old shore line filled in and laid out in beautiful gardens. The public parks and squares



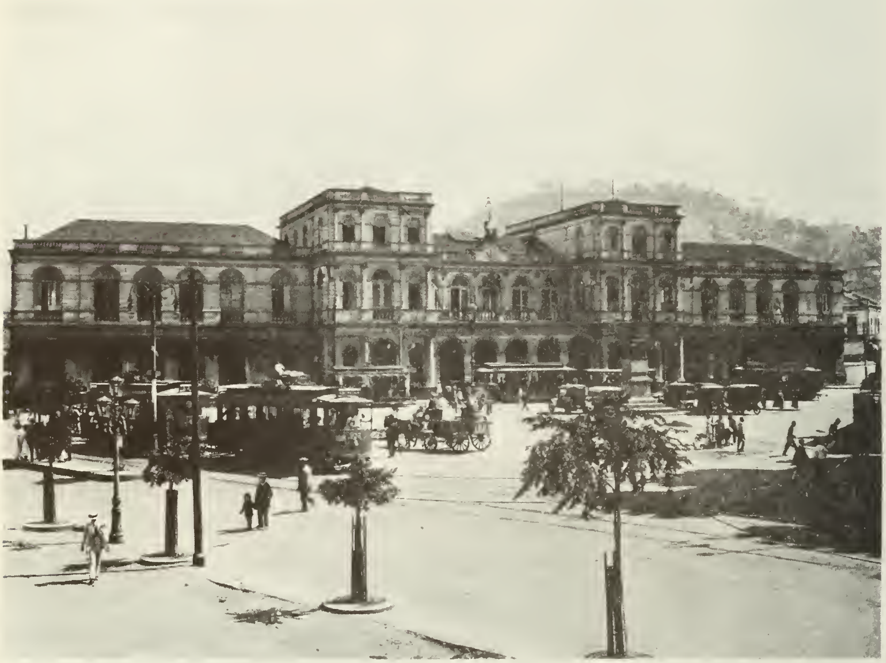
Rio de Janeiro Traffic Conditions and Cars. The southern part of the city from Carioca line



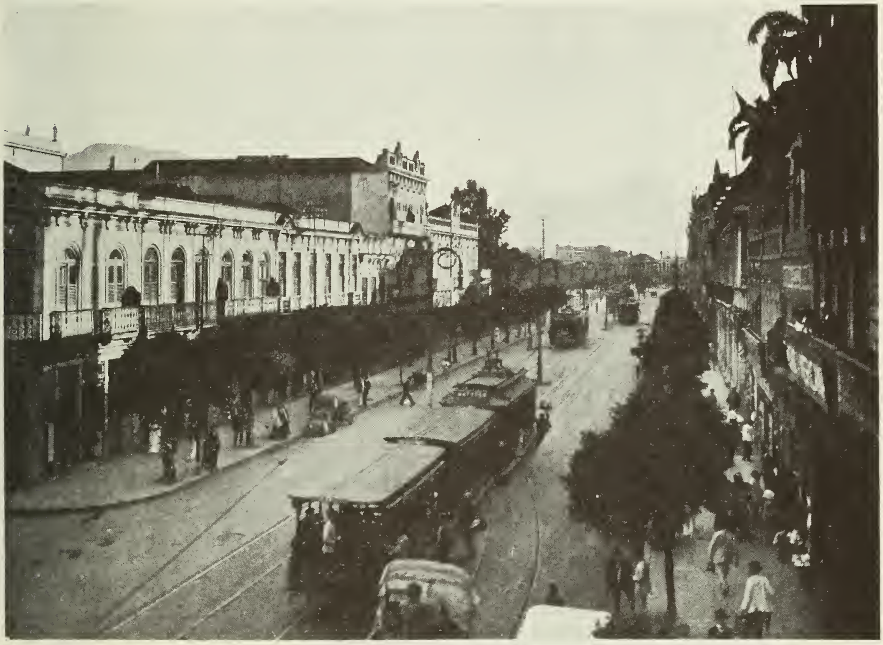
RIO DE JANEIRO TRAFFIC CONDITIONS AND CARS. Standard locomotive and passenger car on cog-road running to top of Corcovado Mountain, an altitude of approximately 2300 ft. above sea level

are numerous and add greatly to the beauty of the city. There are many fine public buildings, churches, theaters, offices, shops and residences, but mainly the city is a mixture of one- and two-story buildings of Portuguese type. The city has one of the finest harbors in the world, and has begun a vast system of quays which will permit the mooring alongside of the largest vessels. There is regular communication with the principal ports of America and Europe, and the coastwise service is excellent. Ferry-boats cross the bay to Nictheroy at frequent intervals. Communication with the interior is maintained by the Ferro Central, Leopoldina and Melhoramentos lines. The city is the seaport for a large area of the richest, most productive and most thickly settled parts of Brazil, and exports coffee, sugar, hides, tobacco and cigars, gold, diamonds, manganese and sundry small products. Its manufacfactures include flour, cotton, woolens and silks, textiles, boots and shoes, clothing, furniture, vehicles, cigars, cigarettes, etc. The general weather conditions are the same throughout the year; the so-called summer from November to April is more or less hot and rainy, and the other months cold with very little rain; frost is unknown.

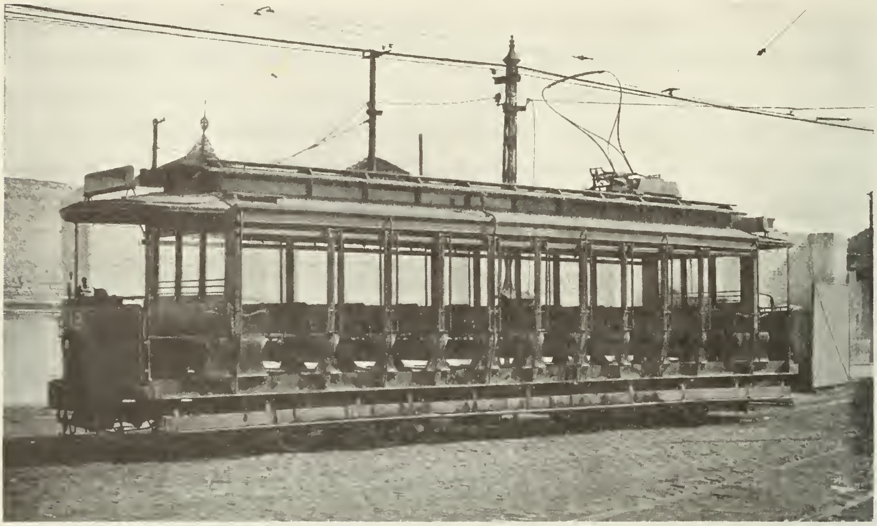
The most important industrial enterprise in the city is the Rio de Janeiro Tramway, Light & Power Company, which controls and operates the tramways, gas, electric light, power and telephone systems, serving the city and federal district. The tramway system is in five groups of lines, formerly the Villa Isabel, Sao Christovao, Carris Urbania, Jardim Botanico, and Corcovado Railway Companies, all now owned and controlled by the Rio de Janeiro Tramway, Light & Power Company, and all equipped and operated electrically. The entire system of lines comprises 215 miles (347 kilometers) of track,



Rio de Janeiro Traffic Conditions and Cars. Terminal of Central Brazil Railroad, at Praca da Republica. Traffic at this point is very heavy in early morning and late afternoon computed as single track, of which 85 miles (137 kilometers) are double track and 45 miles (73 kilometers) are single track. The lines are standard gage, 4 ft. 8½ in.; radius of shortest curve, 35 ft.; the rails used are standard 7-in. girder section. The majority of city streets on which the tracks are laid have asphalt paving, and, while generally level, there are some heavy grades, the steepest being 10 per cent. The car equipment consists of 890 motor and trailer cars available for maximum daily service; about 680 motor and trailer cars are used in normal daily operation. The rush-hour periods of the day occur from 5 to 9.30 in the morning and 4 to 7 in the evening. The cars are not divided into classes, as in many foreign cities, and only one class of fare is charged; the method of collection is the zone system, and no transfers are issued. Traffic is increasing enormously on the entire system,

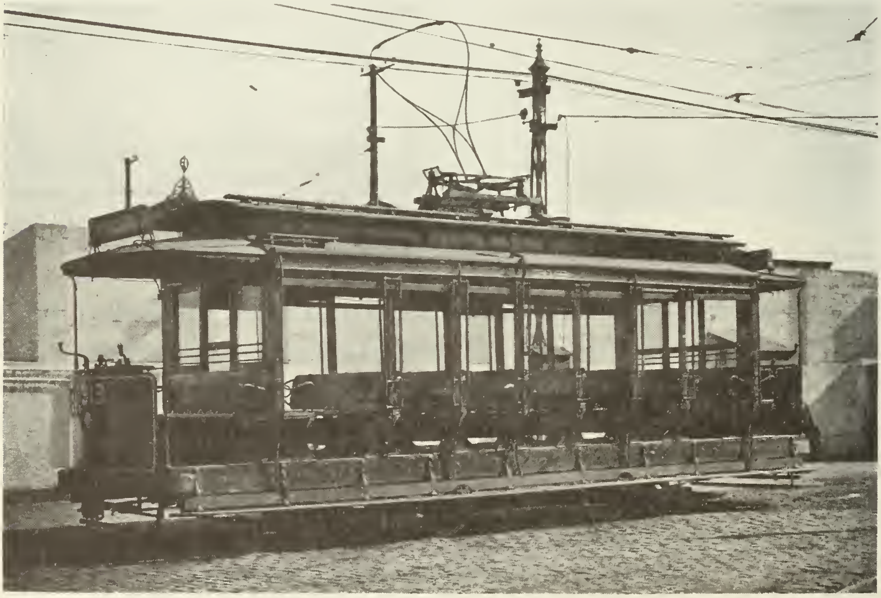


Rio de Janeiro Traffic Conditions and Cars. View on Rua Marechal Floriano Peixoto, taken from the company's main office building. Organ mountain range in the distance



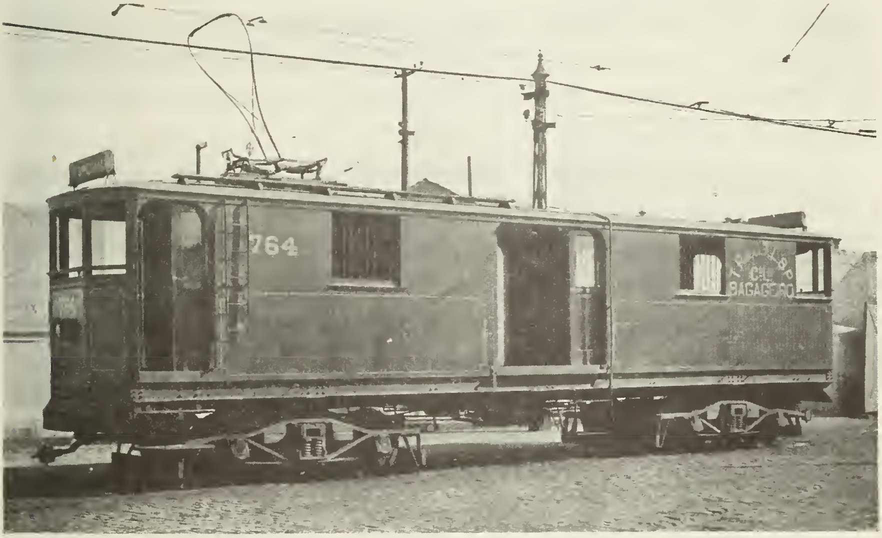
RIO DE JANEIRO TRAFFIC CONDITIONS AND CARS. Standard 13-bench car of Brill Narragansett type. Mounted on Brill No. 27-GE1 trucks

as all classes of people are riding more for pleasure than formerly, and the residence districts are building up largely on



RIO DE JANEIRO TRAFFIC CONDITIONS AND CARS. Standard 10-bench car. Mounted on Brill No. 21-E truck account of the increased speed and safety and convenience of the new system and the new types of cars. In the year 1911, 167,718,528 passengers were carried, and the car mileage was 22,497,045 (36,204,971 kilometers).

Owing to the tropical climate of Rio de Janeiro, which exists practically the year round, no other type of car than the wide-open, running-board, cross-seat type would be acceptable in Rio de Janeiro, and, therefore, there are no convertible or semi-closed cars of any type. There are three standard types of motor passenger cars used on the various lines where new cars have been installed; these are of the American standard open type, of 8-, 10- and 13-bench seating arrangement, 32-, 50- and 65-passenger capacity respectively. The 10-bench cars are mounted on Brill No. 21-E single trucks, and the 13-bench cars are of the Brill "Narragansett" type, mounted on Brill No. 27-GE1 trucks. The 8-bench car weighs, with truck and complete equipment, 22,266 lb. (10,100 kilograms); 10-bench car, 24,692 lb. (11,200 kilo-



Rio de Janeiro Traffic Conditions and Cars. Standard freight and baggage car. Mounted on No. 50-E2 trucks grams); 13-bench car, 39,683 lb. (18,000 kilograms). Besides these there are two older types of passenger cars in service which have 8 benches and seat 4 passengers to the bench; they are built without bulkheads and weigh, approximately, 18,739 lb. (8500 kilograms) each. Four types of passenger trailers are used, which have 8 and 10 benches, are without bulkheads, and weigh 5291 lb. (2400 kilograms) to 6413 lb. (2900 kilograms). A special type of car and locomotive is used on the Corcovado Mountain Rack Railroad. The locomotives weigh 36,376 lb. (16,500 kilograms) and are equipped with two 75 hp., 3-phase, 750-volt motors. The passenger cars for this road have 11 benches, seat 55 people, and weigh 10,704 lb. (4900 kilograms) each.

The Rio de Janeiro Tramway, Light & Power Company also uses large, double-truck baggage cars weighing 44,092 lb. (20,000 kilograms); single-truck Brill centrifugal sprinkling cars weighing 25,574 lb. (11,600 kilograms); 16-ft. box type mail cars weighing 14,330 lb. (6,500 kilograms); double-truck locomotives weighing 29,762 lb. (13,500 kilograms); double-truck flat service cars (with pneumatic crane) weighing 25,353 lb. (11,500 kilograms); single-truck flat cars weighing 15,432 lb. (7000 kilograms). A peculiar feature of the Rio Company's old equipment is several types of wedding cars. There are no funeral cars, as in some other cities, notably in Mexico City.

When the Rio Company took hold of the tramway systems some of the lines were using the German harp trolley, and this system was found to be so adaptable to the climate that the company adopted it as its standard, and all cars are equipped with this system, or will soon be so equipped. The motor equipment is of several makes, both European and American, but the American has been found to be the more satisfactory and best adapted to the conditions. Air brakes are used on practically all the cars, as well as hand-power brakes. All cars are equipped with illuminated signs of the best American make.

The electric energy utilized by the company in its electric light, power and tramway services is developed at its own hydro-electric plant on the River das Lages, 51 miles from the city of Rio de Janeiro, and is transmitted over four copper-wire circuits carried on two lines of steel towers to the sub-stations in the city and federal district. The capacity of the present hydro-electric plant is about 50,000 hp., which can be augmented from time to time, to meet the increasing requirements, up to 100,000 hp. The hydro-electric installations on the River das Lages are operated by the company under and by virtue of a perpetual concession from the government of the state of Rio de Janeiro. The company also owns a perpetual concession for the development of electric energy on the River Parahyba, which is capable of developing a further 100,000 hp. The electric light and power in the federal district of Rio de Janeiro is distributed by an extensive system of underground canalizations in the center of the city and aerial lines in the suburbs. This system is operated under the authority of the municipal government by virtue of a concession extending until the year 1990.

All the employees of the company are natives, with the exception of the heads of departments, who are Americans.

In the beginning of street railway operation in Brazil the natives used to delight in tipping over cars in the streets during riots, in order to show their spite against the companies, but the heavier American cars and equipments are largely doing away with this practice, and, indeed, the Brazilians are more and more realizing the utter uselessness of this method of venting their spite on the companies, and are finding the system so attractive and agreeable that they are much easier to get along with than they used to be.

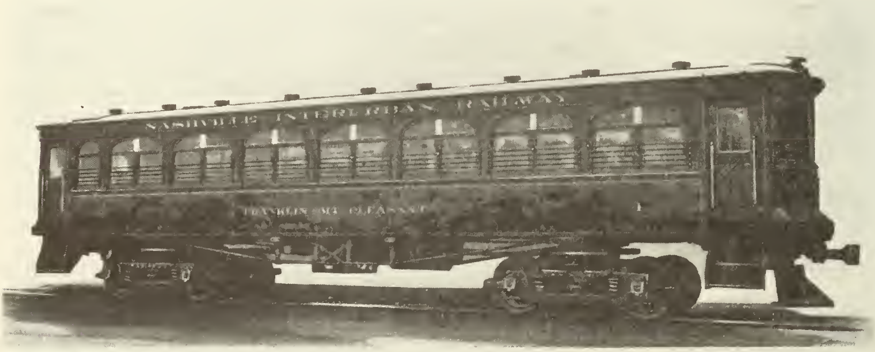
Across the Bay, at Nictheroy, is a street railway system furnished and installed by the Rio Company, including power plant and cars, but this system has never been operated by the Rio Company, being still in the hands of a private person.

NEW EQUIPMENT FOR NASHVILLE INTERURBAN RAILWAY

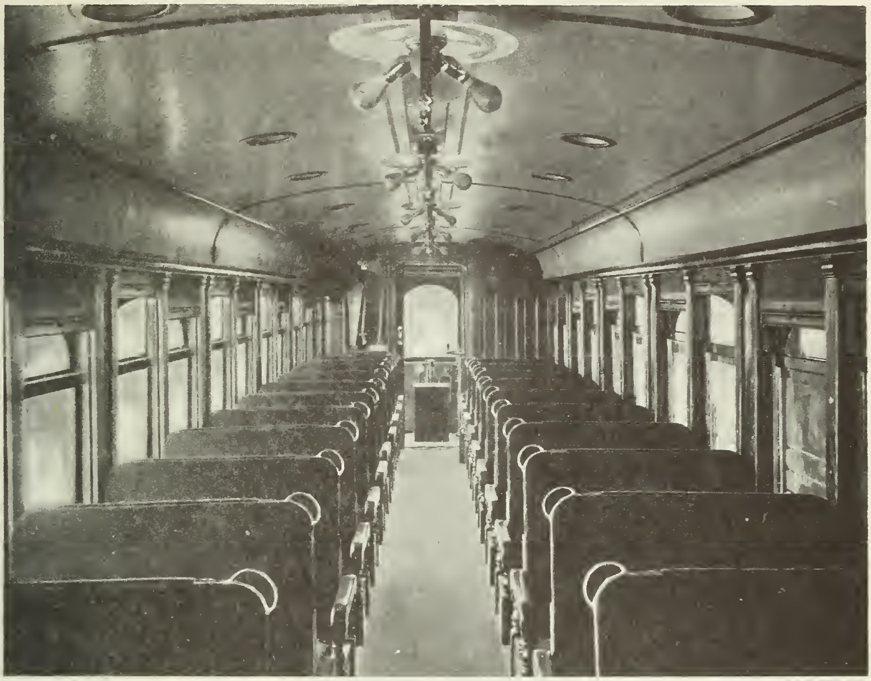
BRILL NO. 27-MCB1 TRUCKS

THE car illustrated is a type which has just been delivered to the Nashville Interurban Railway, which at present extends from Nashville to Franklin, Tenn., a distance of about 17 miles, by the American Car Company. It is the intention, however, to extend this line farther south, and this car is for operation on the section between Franklin and Mt. Pleasant, a distance of about 33 miles.

This car is equipped with the light Brill plain arch type of roof and is mounted on Brill high-speed trucks of the No. 27-MCB1 type. The windows are of the regular twin, double-sash type used in interurban service, the arch-top upper sashes being stationary and the lower arranged to raise. On the other side of the car, opposite the single window shown in the photograph, in the rear left-hand corner of the car, is a toilet-room. Side sheathing of sheet steel is used below the windows on both sides of the car, securely riveted to the side posts. The platforms are 4 ft. 3 in. long and are flush with the floor of the carbody. Single hinged doors,



Cars for Nashville. Cars are equipped for single-end operation and mounted on Brill high-speed trucks of the No. 27-MCB1 type



Cars for Nashville. The lower window sashes are arranged to raise their full height. Seating capacity, 56

which swing back against the body-end bulkheads, are located on each side of the platforms. The vestibules are provided with three sashes, the center one being stationary and fitted with plate glass, while the two outer sashes drop into pockets. Both body-end bulkheads have single sliding doors, 30 in. wide.

The composite underframing is of long-leaf yellow pine; side sills 4½ by 7¾ in., plated on the inside with 15 by ⅜-in. plate and, in addition, reinforced at the bolsters with 6 by 3½ by ⅜-in. angle iron; intermediate and center sills of long-leaf yellow pine, 4½ by 7 in., both intermediate sills from platform crown piece to body bolsters being reinforced with 6 by 3½ by ⅜-in. steel angles; end sills of white oak 4½ by 7 in., reinforced with 6 by ½-in. plates, bent to shape of channel and securely bolted between the side and intermediate sills, also between intermediate and center sills. Ash is used for both corner and side posts in the upper framing, the corner posts being 3½ in. thick and the side posts of two thicknesses—those dividing the twin windows are 2¼ in. wide and those between each pair of twin windows, 3 in.

The interior is finished in cherry, stained mahogany, and the ceiling is of composition board. The seats are of the Brill "Winner" type, covered with plush, and arranged 13 transverse seats with reversible backs, and a longitudinal seat for two persons in each corner, on one side of the aisle, and 11 transverse seats with reversible backs, one stationary transverse with back against heater compartment, and one longitudinal seat in the forward corner on the opposite side; the combined seating capacity is 56. The toilet room in the rear left-hand corner of the car is fully equipped and has a water-cooler set in alcove. The floor of this compartment is covered with zinc.

Length over corner posts	40 ft. 10 in.	From floor to center of headlining	7 ft. $1\frac{11}{16}$ in.
Length over platforms	49 ft. 4 in.	Risers	11½ in.
Length of platforms	4 ft. 3 in.	Seating capacity	56
Centers of side posts	2 ft. 8 in.	Type of trucks	Brill No. 27-MCB1
Width over sides	8 ft. 2½ in.	Wheel base	6 ft. 6 in.
Extreme width	8 ft. 5¾ in.	Diameter of wheels	33 in.
From track to side sills	3 ft. 6½ in.	Size of journals	3¾ in. by 7 in.
Side sills over trolley boards	8 ft. 3 in.	Type of motors	GE-204—4
Track to step	$17\frac{1}{16}$ in.		

* * *

EQUIPMENT FOR NEW BRAZILIAN LINE

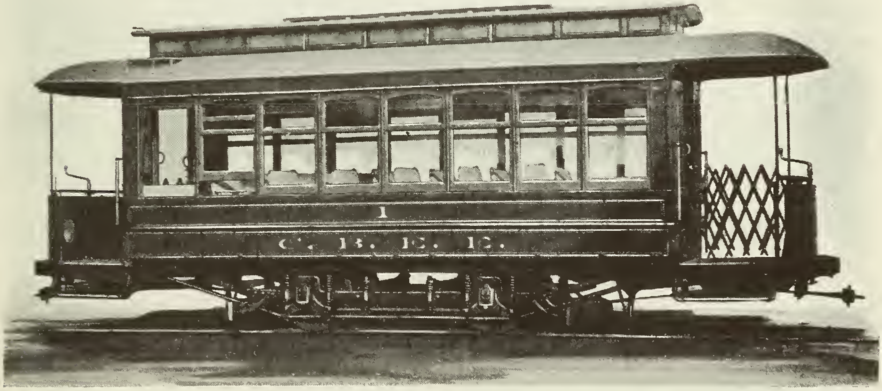
BRILL SEMI-CONVERTIBLE TYPE

THE J. G. Brill Company recently shipped to the Petropolis Tramways of Petropolis, Brazil, eight 20-ft. 8-in. closed cars, the standard type of the builder, having the Brill semi-convertible window system and mounted on Brill No. 21-E trucks, and another lot of four of the same type is now in the course of construction.

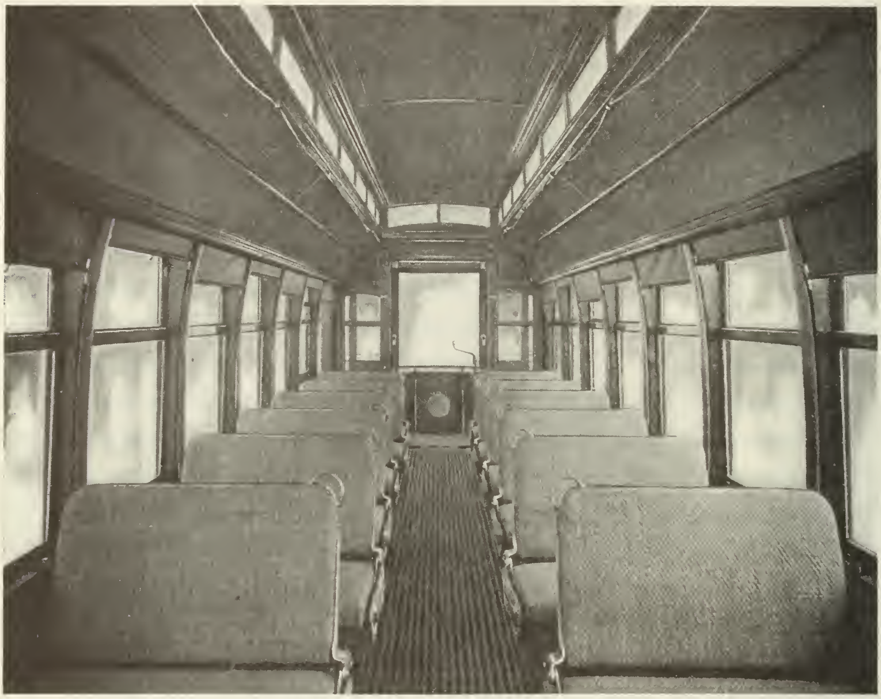
Petropolis is situated about 37 miles north of Rio de Janeiro at an altitude of about 2700 ft., and is well known in Brazil as a healthful summer resort. The new cars, which constitute the initial equipment of this road, are for service on one line running through the principal streets of the city, a section of which from Alto da Serra to Cascatinha, 13 miles long, is about to be inaugurated. The current for operation is produced at the Alberto Torres plant, owned by the Cia. Brazileria Energia Electricas, located about 31 miles (50 kilometers) from Petropolis. The cars are for all-year service, as having the Brill semi-convertible window system they are adaptable to and give satisfactory service both during the warm and rainy season, which extends from November to April, and the cooler season during the rest of the year.

The underframes are of substantial wooden construction, the side sills being of long-leaf yellow pine 4¾ by 5⅜ in., end sills of oak 3½ by 6⅝ in., and crossings of the same 3½ by 4¾ in. The upper framing consists of straight-grained ash corner posts 3⅝ in. thick, and side posts of the same 2¼ in. thick; sweep of posts, 1¾ in.

The interior woodwork is of cherry, sanitary finish, and the ceilings of three-ply birch veneer, neatly decorated. The transverse seats are 35 in. long, six on each side of the aisle, and are equipped with push-over backs of the Brill "Winner".



Cars for Petropolis. Standard Brill Semi-Convertible type. Mounted on Brill No. 21-E truck having "Wide-Wing" journal boxes



CARS FOR PETROPOLIS. The omission of wall pockets with Brill Semi-Convertible window system permits an aisle width of 22 in. Seats are of Brill "Winner" type and accommodate 32 passengers

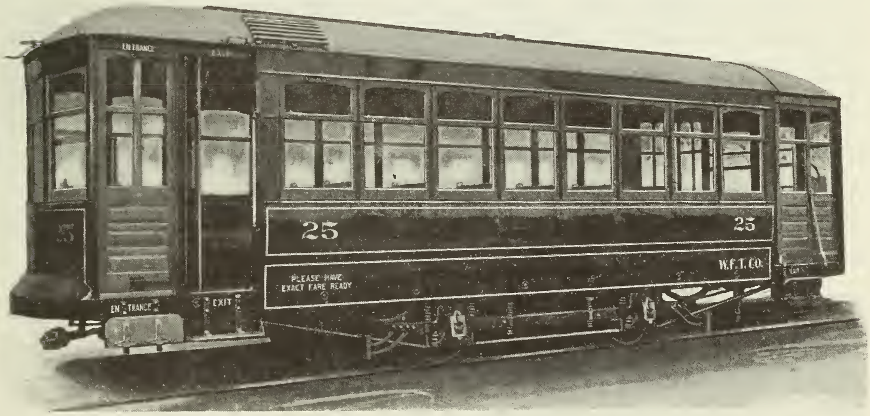
type; longitudinal seats for two passengers each are located in the corners, a total seating capacity of 32. The aisle width is 22 in., which is made possible by the omission of the wall pockets with the semi-convertible window system. There are a number of patented specialties, both in the car and truck equipment, such as platform gongs, signal bells, sand boxes, drawbars, brake handles, etc., and the truck with the "Half-Ball" brake hangers and "Wide-Wing" journal boxes, all of the builder's manufacture.

Length over corner posts	20 ft. 8 in.	Type of truck	Brill No. 21-E
Length over platforms	29 ft. 8 in.	Wheel base	7 ft. 0 in.
Length of platforms	4 ft. 6 in.	Diameter of wheels	33 in.
Centers of side posts	2 ft. 5 in.	Size of journals	3¾ in. by 7 in.
Width over sills	7 ft. 9¼ in.	Type of motors	GE53—2-45 hp.
Width over posts	8 ft. 0 in.	Weight of car body less elec. equipment	10,200 lb.
From track to side sills	2 ft. 2⅝ in.	Wt. of electrical equipment	1,000 lb.
From track to step	15¾ in.	Weight of trucks	6,100 lb.
Step to platform	14 in.	Weight of motors	5,500 lb.
Platform to floor	5¾ in.	Total weight	22,800 lb.
Seating capacity	32		

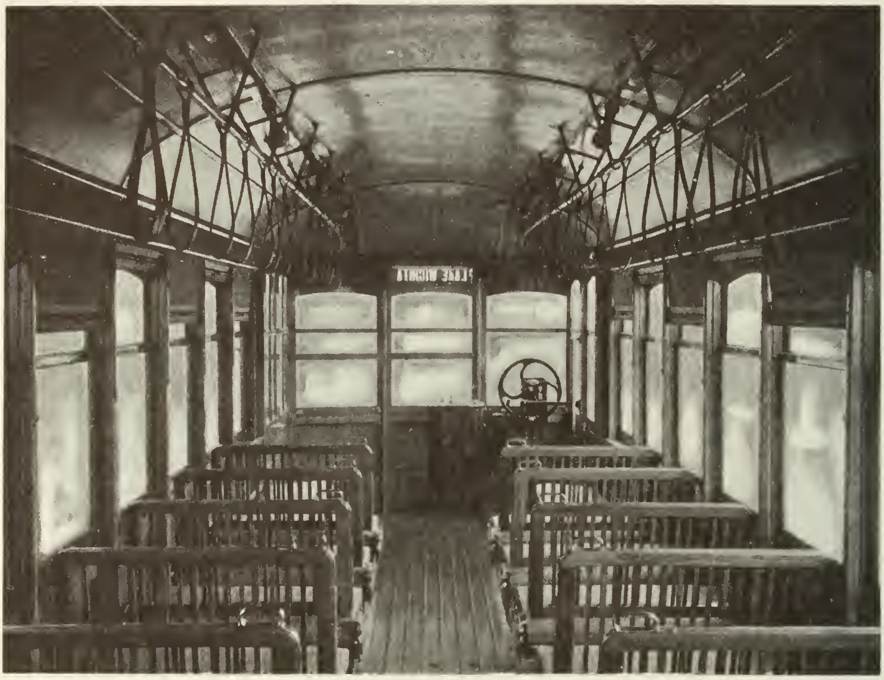
LIGHT-WEIGHT CARS FOR WICHITA FALLS, TEX.

BRILL PLAIN ARCH ROOF

A NUMBER of single-truck motor cars for prepayment operation of remarkably light weight were delivered a short time ago to the Wichita Falls Traction Company of Wichita Falls, Texas, by the American Car Company. These cars are similar to a lot delivered to the Muskogee Traction Company, of Muskogee, Oklahoma, and described in the December, 1911, issue of Brill Magazine. The method of construction, material used and equipment were given careful consideration in obtaining this light weight, approximately 7000 lb., consistent with the maximum passenger load. The use of the Brill plain arch type of roof; the flush platforms, the omission of body-end bulkheads, side and end linings, and side wall pockets, and the use of side posts only 1½ in. thick, are among the features which permit a large reduction in weight.



Cars for Wichita Falls. The use of Brill plain arch type of roof, flush platforms, and the omission of body-end bulkheads and side window pockets permit a large saving in weight. Weight of car, approximately 7,000 lb. Mounted on Brill No. 21-E truck



CARS FOR WICHITA FALLS. Upper sashes are stationary while the lower are arranged to be held at various heights. Seats have spring rattan cushions, and seat 32 passengers

The platforms are completely enclosed with exit and entrance folding doors on one side and a single sliding exit door on the opposite side. The double doors are operated separately by levers from the conductor's position and the single sliding exit door by a lever from the motorman's position; single folding steps are operated in conjunction with these doors. All upper sashes are stationary and the lower are arranged to be held at various heights. The seats are of the combination rattan and wood type, having spring rattan cushions and ash spindle backs, and are of the Brill "Winner" reversible-back type. Six transverse seats and two longitudinal corner seats for two passengers on each side of the aisle seat 32 passengers. The interiors are of ash finish, with ceilings of composition board.

The cars are built on underframes composed entirely of wood, long-leaf yellow pine, 3½ by 7¾ in., being used for side sills, with end sills and crossings of oak, 2½ by 4 1/16 in. The upper framing is composed of ash corner and side posts, 2½ in. and 1½ in., respectively.

The side posts are equipped with push buttons, and most of the miscellaneous equipment is of Brill manufacture. The trucks are of the Brill No. 21-E type.

The Wichita Falls Traction Company operates 8 miles of track in Wichita Falls, located near the Red River, along the northern border of Texas, the terminus of the line being at Wichita Lake.

Length over corner posts	21 ft. 3 in.	From floor to center of headlining	7 ft. 11¼ in.
Length over platforms	31 ft. 3 in.	Track to step	17 in.
Length of platforms	5 ft. 0 in.	Step to platform	13 in.
Centers of side posts	2 ft. 6 in.	Seating capacity	32
Width over sills	7 ft. 6 in.	Type of trucks	Brill No 21-E
Width over posts	7 ft. 11 in.	Wheel base	8 ft. 0 in.
From track to side sills	1 ft. 10¼ in.	Diameter of wheels	30 in.
From side sills over trolley boards	8 ft. 11½ in.	Type of motors	GE. 54—2

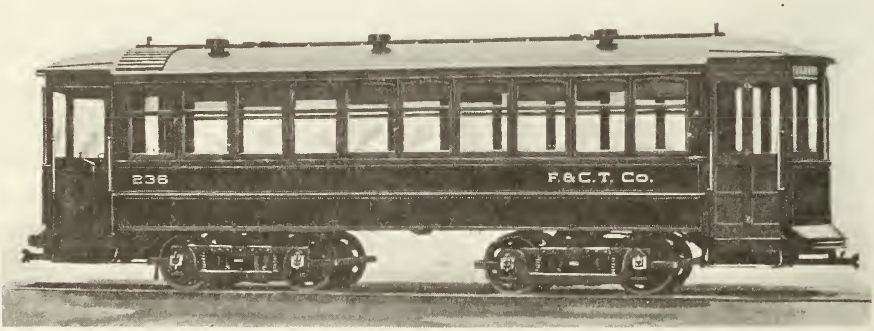
NEW INTERURBAN CARS FOR FAIRMONT & CLARKSBURG TRACTION COMPANY

BRILL PLAIN ARCH ROOF

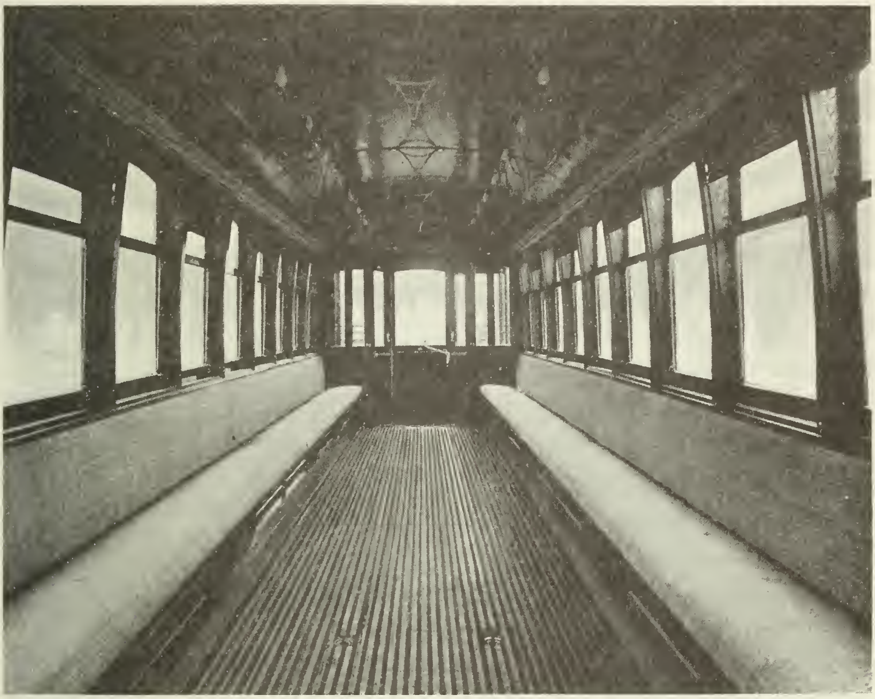
THE use of the plain arch type of roof for interurban service was adopted recently by the Fairmont & Clarksburg Traction Company (now consolidated with the Fairmont & Northern Traction and the Clarksburg & Weston Electric Railway Companies into the Monongahela Valley Traction Company), saving a considerable amount of weight. The cars were built by the G. C. Kuhlman Car Company. The Monongahela Valley Traction Company operates 69 miles of track in northern West Virginia, connecting Fairmont and Clarksburg and a number of intervening towns along the Monongahela River. The cars are now in operation on the Wilsonburg and Bridgeport lines, running through Clarksburg, where they are giving entire satisfaction both to the public and the company, and will doubtless be adopted as the standard type of the system for this class of service. The trucks are the Brill high-speed No. 27-MCB1 type.

The cars are built on substantial underframes, consisting of yellow pine side sills 4 by 7½ in., reinforced with 15 by ⅜ in. steel plates and $3^1/_{16}$ Z-bars; end sills of 9-in. 13.25-lb. channels; crossings of 4-in. 5.25-lb. channels with oak fillers, securely fastened to the side sills and diagonal braces by $^3/_{16}$-in. gusset plates; center stringers of 8-in. 13.25-lb. channels with webs placed vertically and a filler channel with web placed horizontally. The platforms are supported on center knees, and outer knees of 4-in. 5.25-lb. channels. The members of the upper framing are of ash, the corner posts being 3⅝ in. thick and the side posts 2¼ in. thick.

As the cars are also used for suburban service, they carry quite a number of short distance riders; therefore, their equipment with longitudinal seats, which accommodate 40 passengers, gives them a large total capacity on account of the increased standing space. The sashes are of the double type, the upper being stationary and the lower arranged to raise,



CARS FOR FAIRMONT & CLARKSBURG. The cars have 28-ft. bodies and are mounted on Brill No. 27-MCB1 high-speed trucks



Cars for Fairmont & Clarksburg. The upper sashes are stationary and the lower raise their full height. Seating capacity, 40

while those in the vestibules drop into pockets. The doors in the bulkhead are of the sliding type, equipped with mutually-operating door mechanism, while those in the vestibules are of the hinged two-part type, folding back against the body ends. The interiors are finished in cherry.

The principal dimensions and weights are as follows:

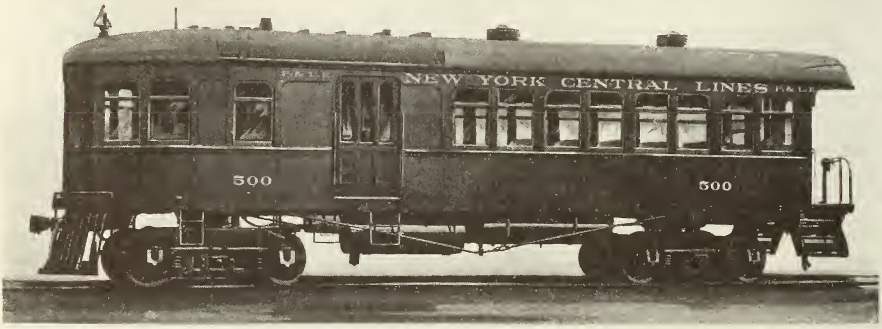
Length over corner posts	28 ft. 0 in.	From track to step	16½ in.
Length over platforms	38 ft. 0 in.	From step to platform	14½ in.
Length of platforms	5 ft. 0 in.	Platform to floor	11 in.
Centers of side posts	2 ft. 8 in.	Seating capacity	40
Width over sills	7 ft. 10½ in.	Type of trucks	Brill No. 27-MCB1
Width over posts	8 ft. 2 in.	Wheel base	6 ft. 0 in.
Extreme width	8 ft. 6 in.	Diameter of wheels	33 in.
From track to side sills	2 ft. 11$\frac{5}{16}$ in.	Size of journal	3¾ by 7 in.
From side sills over trolley boards	8 ft. 11⅜ in.	Weight of carbody less electrical equipment	16,560 lb.
From floor to center of headlining	7 ft. 9⅝ in.	Weight of trucks	14,600 lb.

GAS-ELECTRIC MOTOR CAR FOR NEW YORK CENTRAL LINES

PASSENGER AND BAGGAGE TYPE

THE Pittsburgh & Lake Erie Division of the New York Central Lines recently received the car illustrated, which is equipped with the General Electric Company's gas-electric system, from the Wason Manufacturing Company. The Pittsburgh & Lake Erie Railroad, which extends from Youngstown, in northeast Ohio, to Pittsburgh, Pa.. where it branches into two sections, one going to Brownsville and the other to Connellsville, in southwest Pennsylvania, handles an extensive freight business, its equipment consisting of 240 locomotives and 24,929 freight cars, in addition to 138 passenger and 430 miscellaneous cars.

The car illustrated is divided into passenger and baggage compartments, the only entrance and exit to the latter being through the rear platform. The interior of the passenger compartment is equipped as per the railroad company's standard practice, the finish being of mahogany and the ceiling of three-ply wooden veneer. The seating capacity is 42.



Gas-Electric Motor Car for New York Central Lines. Car is of all-steel construction and equipped with General Electric Company's gas-electric system. Seating capacity, 42

The baggage compartment is 6 ft. in length, and may be entered from the passenger compartment through a full mahogany swinging door; entrance from the exterior is made through the sliding door visible in the photograph. A compact power plant, consisting of a gasoline engine directly connected to an electric generator, is located in this compartment. The energy thus obtained is applied to standard railway motors, mounted upon the axles, through a suitable controller in a manner similar to that used in ordinary trolley cars. The radiators, located as they are upon the roof, are securely protected from damage due to flying stones, and in addition are freed from the excessive vibration to which they would be subjected if secured beneath the underframe of the car.

The underframing is of steel throughout and is constructed of center sills of 6-in. 12¼-lb. I-beams; side sills of 6-in. 8-lb. channels; needle beams of 6-in. 12¼-lb. I-beams; floor beams of 4-in. 5¼-lb. channels; sway braces of 2-in. by ¼-in. bar iron; all crossings are securely gusseted to the longitudinal members. The upper framing is also of steel, the side posts consisting of 2 by 2 by ¼-in. tees; rafters of 1½ by 1½ by 3/16-in. tees; side plates of 3½ by 2½ by 5/16-in. ells. All framing is securely riveted together with wrought-iron brackets. The side sheathing from bottom of side sill to window stool angle, except around the baggage-room door, is of 9/16-in. sheet steel; from the top of window stool angle to letter board is wood.

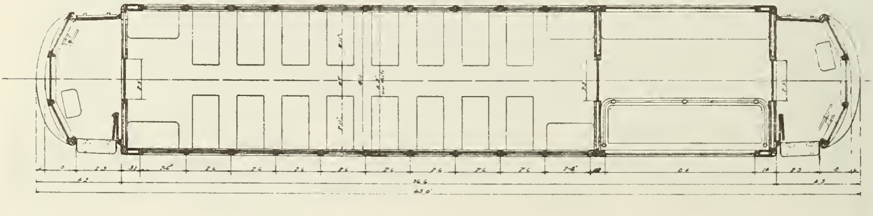
The principal dimensions are as follows:

Length of body	38 ft. 11⅜ in.
Length over platforms	42 ft. 7⅜ in.
Length of platforms	3 ft. 2 in.
Length of baggage comp.	6 ft. 0 in.
Centers of side posts	2 ft. 6 in.
Width over sills	10 ft. 0¼ in.
Width over posts	10 ft. 0 in.
Extreme width	10 ft. 2¾ in.
From track to side sills	3 ft. 7¾ in.
From side sills over roof	12 ft. 7⅝ in.
From floor to center of head-lining	8 ft. 2¼ in.
Track to step	$18\frac{11}{16}$ in.
Risers	10⅝ in.
Seating capacity	42
Wheel base, Motor	6 ft. 6 in.
Wheel base, Trailer	6 ft. 0 in.
Diameter of wheels	33 in.
Size of journal, Motor	5 in. by 9 in.
Size of journal, Trailer	4¼ in. by 8 in.

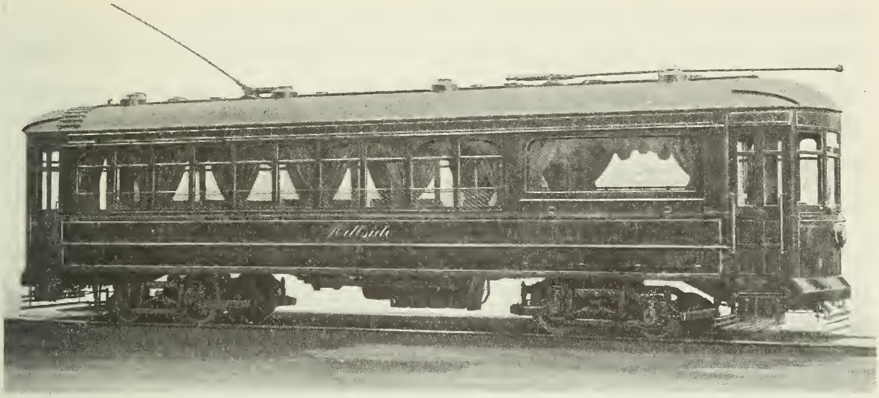
FUNERAL CAR FOR PHILADELPHIA

SERVICE RECENTLY INAUGURATED

THE Philadelphia Rapid Transit Company has placed in service during the last month a funeral car, built by the J. G. Brill Company, which is similar to a car furnished to the Chicago City Railways Company and shown in BRILL MAGAZINE, issue of April, 1910. This is the first time that a car for funeral service has been used in Philadelphia, and within the three weeks that the car has been available it has been engaged for eight funerals and, as soon as the public appreciates the convenience, doubtless other cars will soon be required to meet the needs of this branch of service, as the large cemeteries are in the outskirts of the city, making the trip by carriage from the center of the city very tedious and expensive. The Hillside Cemetery, for instance, is about 15 miles from the center of the city and, although outside of the city limits, the same charge is made for the use of the car as to any of the cemeteries within the boundaries—twenty-five dollars. Should additional accommodations be required, extra motor cars are furnished at about half the rate for a funeral car. A folding carriage is carried in the car to convey the casket from the house to the car and from the car to the grave, if the distances make this necessary. After the car has stopped at the cemetery gate, it proceeds to the end of the line and returns at a given time, thus obviating the neces-



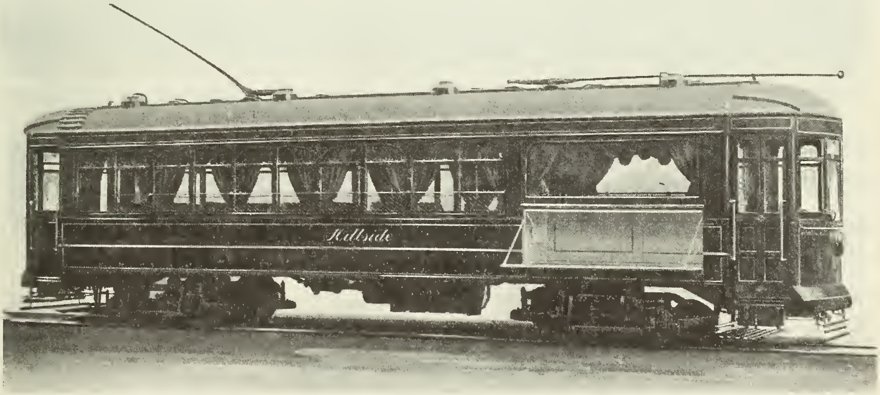
FUNERAL CAR FOR PHILADELPHIA. Seating capacity of main compartment, 40. Seating capacity of pall-bearers' compartment, 6



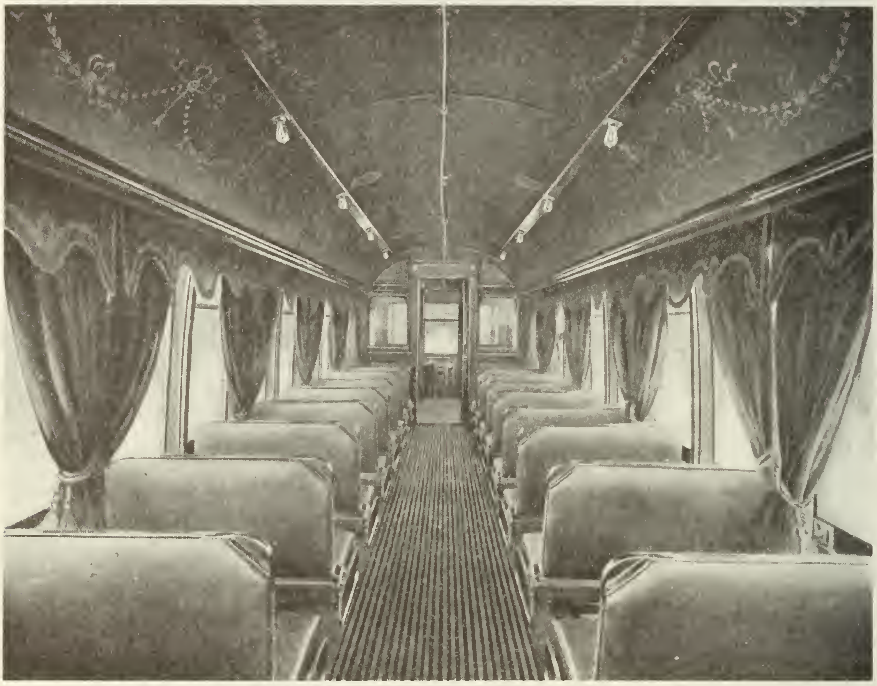
Funeral Car for Philadelphia. The window system is the Brill semi-convertible type. Car is mounted on Brill No. 39-E trucks, which are the standard of the system since the adoption of the "Nearside" cars

sity of installing a siding. In returning from the cemetery persons are let off at the streets they designate.

The car is constructed with the plain-arch type of roof and semi-convertible window system of the builder, and is mounted on Brill single-motor No. 39-E trucks, standard on the Philadelphia lines since the adoption of the "Nearside" cars. The windows are arranged in pairs and fitted with double sash, the lower sash automatically engaging the upper when raised into roof pockets, and a long stationary window

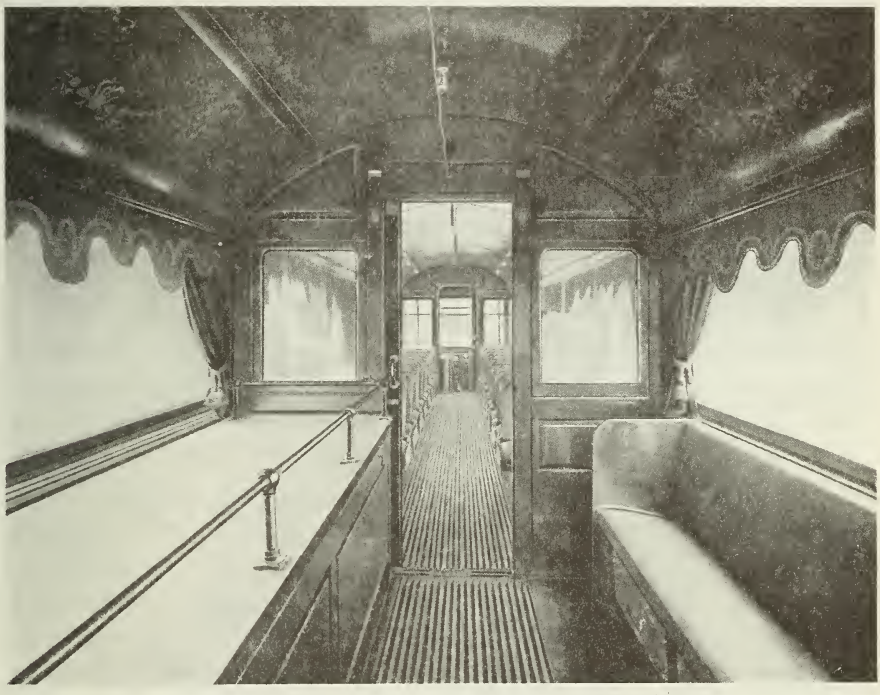


Funeral Car for Philadelphia. The outside panel, enclosing the casket compartment, is opened and closed by mechanism similar to that used in upper berths of sleeping cars. The car is painted a very dark green fitted with plate glass and occupying the space of four windows, on each side of the car. The vestibule sashes are also of the double type, the lower sash dropping into pockets and the upper arranged to raise; the sash to the motorman's right is stationary for use as a sign-box, and is composed of a single light of glass. Directly beneath the long plate-glass window on one side of the car a section of the side panel, 8 ft. 4 in. long, is hinged on the underside and opens outward, giving entrance to the casket compartment. This panel is drawn down to the level of the floor of the compartment by two handles on the outside and is closed by means of a strong spring pulley and cable, the same as used in upper berths of sleeping cars. Rollers fitted to the inside of the panel permit the casket to slide into its compartment with little effort on the part of the pall-bearers.



FUNERAL CAR FOR PHILADELPHIA. Looking towards the rear of the main compartment from the partition separating the pall-bearers' compartment. The seat coverings and hangings are black.

As the car is for double-end operation, it is constructed with two platforms, both sides of which are enclosed with a two-leaf hinged door which folds back against the body end. The door openings in the body-end bulkheads and the partition between the main and the pall-bearers' compartments are 27 in. wide and provided with single sliding doors with glass in the upper part; the partition has two hinged sashes, one on each side of the door, which open into the pall-bearers' compartment. The latter compartment, 9 ft. 11¼ in. long, is provided with a longitudinal seat accommodating 6, and faces the casket compartment. As can be seen in the photograph, there is a low brass railing on top of the casket compartment surrounding a brass plate on which the flowers may be placed. All cross seats are of the Brill "Winner" type, with pressed steel pedestals and wall and aisle plates, and are covered with



FUNERAL CAR FOR PHILADELPHIA. The casket compartment is covered with a brass sheathing on which flowers are placed.

black leather. In the main compartment, which is 26 ft. 6¾ in. long, eight cross seats, 35 in. wide, and a longitudinal seat in each corner seating two passengers each, provide seating accommodations for 40 persons. The width of the aisle is 27 in. The interior woodwork of the car is of cherry and the ceiling of three-ply maple veneer appropriately decorated. The curtains throughout are of Moroccoline leather.

Length over corner posts	36 ft. 6 in.
Length over platforms	44 ft. 0 in.
Length of platforms	3 ft. 9 in.
Length of pall-bearers' compartment	9 ft. 11¼ in.
Length of mourners' compartment	26 ft. 6¾ in.
Centers of side posts	2 ft. 6 in.
Width over sills	8 ft. 2¾ in.
Width over posts	8 ft. 5 in.
Extreme width	8 ft. 6 in.
From track to side sills	2 ft. 6¾ in.
From rail over trolley boards	11 ft. 7⅜ in.
From track to step	13$\frac{15}{16}$ in.
From step to platform	13 in.
From platform to floor	10½ in.
Seating capacity	46
Type of trucks	Brill No. 39-E
Wheel base	4 ft. 10 in.
Diameter of wheels	33 in. and 22 in.
Size of journals	4¼ in. by 3 in.
Type of motors	West. 56-2-55 hp.
Weight of carbody less electrical equipment	21,180 lb.
Weight of electrical equip.	1,200 lb.
Wt. of air-brake equipment	1,500 lb.
Weight of trucks	10,000 lb.
Weight of motors	6,000 lb.
Total weight	39,880 lb.

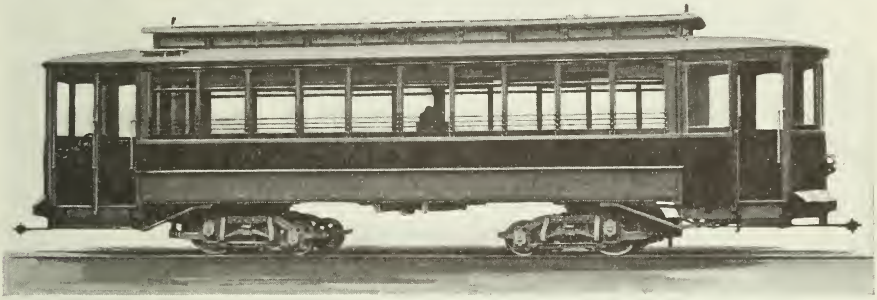
* * *

PAY-AS-YOU-ENTER CARS FOR SAGINAW, MICH.

BRILL No. 62-E TRUCKS

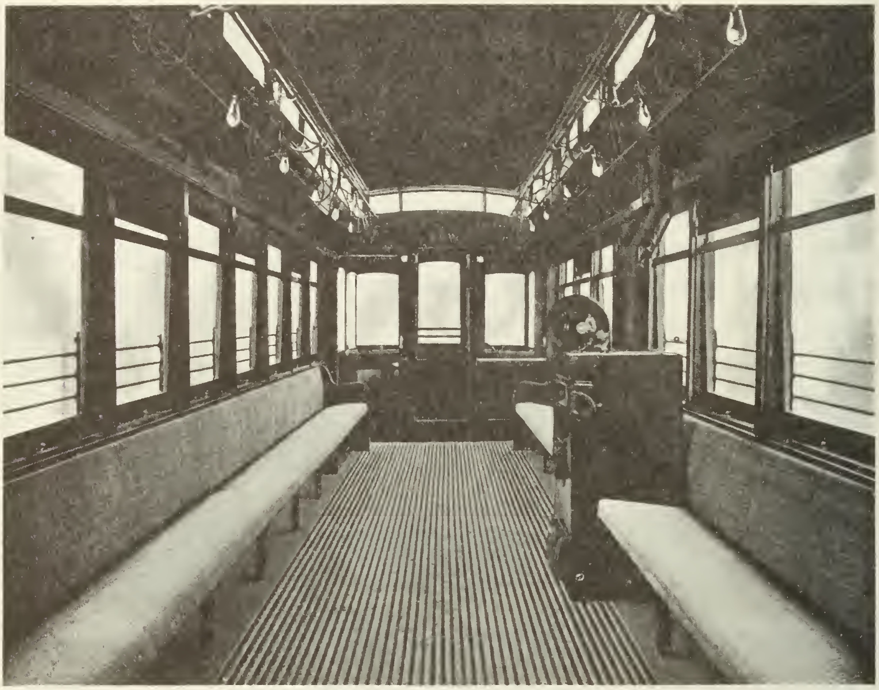
THE 28-ft. pay-as-you-enter car illustrated is a type recently furnished to the Saginaw-Bay City Railway Company by the G. C. Kuhlman Car Company. This type almost duplicates six cars furnished to the Saginaw Valley Traction Company a couple of years ago. The Saginaw-Bay City Railway Company operates 34 miles of track, including all the street railway lines in Saginaw and Bay City and an interurban line connecting the two cities. Saginaw, located in the east central part of Michigan, is bisected into eastern and western sections by the Saginaw River, and is situated 12 miles south of Bay City. All the pay-as-you-enter cars of the system are in operation on the Court and East Genesee line in Saginaw, connecting the eastern and western sections of the city.

The platforms of the last order are divided into two sections by stationary railings. Two single swinging vestibule doors are hinged to a wooden center stanchion located at the edge of the platform on the controller side of the car. This stanchion also divides the platform into entrance and exit passages; the long single step on this side is stationary. On the opposite side of the platform is a single exit door which slides into a double pocket and is provided on the inside with a handle and a lock, to be operated by the motorman from the inside only; a single folding step is operated in conjunction with the door. The body ends have two single doors, one for entrance and one for exit, which slide into a central bulkhead. The seats are of the longitudinal type and provide seating accommodations for 32 passengers, and a wide aisle gives a large capacity in heavy traffic periods. On one side of the car the seat is divided into three parts, there being a single seat, 22¼ in. wide, in the center, which can be removed in the winter and a heater substituted. The interior finish is of cherry, with ceiling of poplar painted Nile green.



Cars for Saginaw. Platforms are 6 ft. 6 in. in length and of pay-as-you-enter type
Mounted on Brill No. 62-E trucks

The underframing is constructed of 4 by 7¾-in. yellow



CARS FOR SAGINAW. Lower sashes drop into pockets, while upper are stationary. Heater can be removed in summer and seat substituted. Seating capacity, 32

pine side sills, reinforced with 15 by ⅜-in. steel plate; end sills of white oak, 5¼ by 6⅞ in., and crossings of the same, 4½ by 5½ in. The body framing consists of straight-grained ash corner posts, 3⅝ in. thick, and side posts of same, 3¼ in. thick; sweep of posts, 1¾ in.

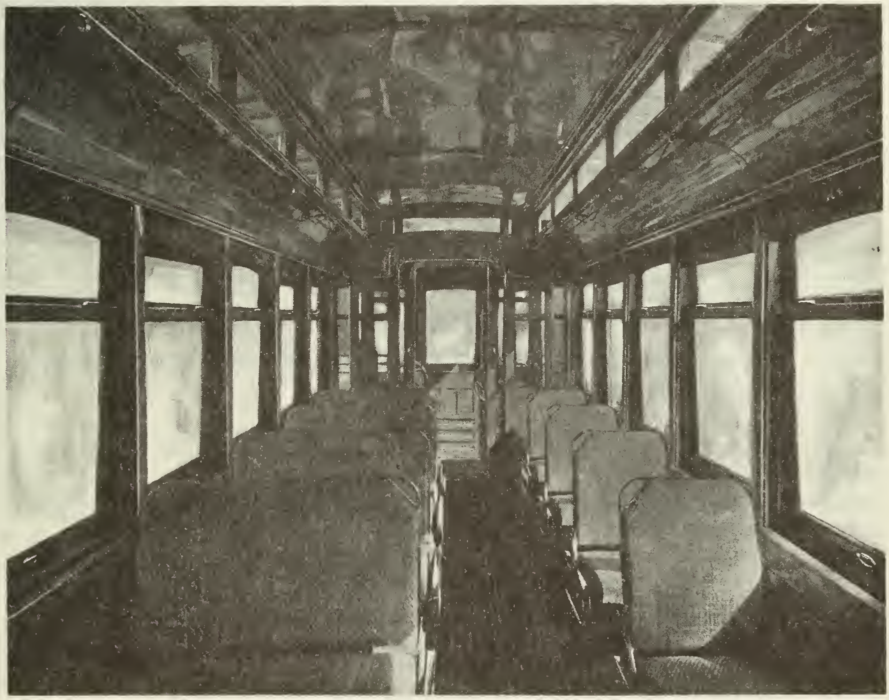
Signal push buttons are provided on the posts, with electric bells on the platform. Platform gongs, signal bells, sand boxes and other patented specialties are of Brill manufacture.

Length over corner posts	28 ft. 0 in.
Length over platforms	41 ft. 0 in.
Length of platforms	6 ft. 6 in.
Centers of side posts	2 ft. 8 in.
Width over sills	8 ft. 0½ in.
Width over posts	8 ft. 4 in.
Extreme width	8 ft. 6½ in.
From track to side sills	2 ft. 8 in.
From side sills over trolley boards	9 ft. 7 in.
From track to step	15⅜ in.
From floor to center of headlining	8 ft. 8 in.
Step to platform	14½ in.
Platform to floor	9 in.
Seating capacity	32
Type of trucks	Brill No. 62-E
Weight of carbody less electrical and air equipment	17,580 lb.
Weight of trucks	16,220 lb.

CLOSED CARS FOR LISBON, PORTUGAL

TEAKWOOD FRAMING

SEVEN standard closed cars, boxed for ocean shipment, left Philadelphia a short time ago for Lisbon, Portugal, via New York. These cars were for the Lisbon Electric Tramways, Ltd., which operates all the street railway lines in Lisbon; the February, 1910, issue of BRILL MAGAZINE contains an article on this system. The trucks on which the cars are mounted are the Brill No. 21-E type, and are equipped with the Brill Wide Wing Journal Box. The vestibules are open at the sides and are provided with open gates; the sashes drop into pockets, the center sash arranged to be held



CARS FOR LISBON. The headlinings are composed of aluminum plates. Sashes drop into pockets. Double seats, 36 in long, and single seats, 19 inches; seating capacity, 20 at various heights by Brill Sash Adjuster. Mutually-operating doors in the body ends have double sashes in the upper part, the top sash being stationary and the lower arranged to drop. The side window sashes are also of the double type, both of which drop into pockets. The cars, being for double-end operation, are provided with seats of the push-over-back type, double seats being on one side of the aisle and single seats on the other. The double seats are 36 in. long and the single seats 19 in. long; four transverse seats on each side of the aisle, with longitudinal corner seats, provide seating for 20 passengers; the width of the aisle is 20¼ in. The interior woodwork of the cars, including doors, linings and mouldings, is of selected white ash, with ceilings of aluminum, painted and striped.

The bottom framing of these cars is of teakwood and consists of side sills 5⅞ by 5⅞ in.; end sills 4⅜ by 7 in.; crossings 3½ by 4¾ in., reinforced with steel plates 2½ by ½ in. Wrought iron truss rods, 2 by ⅜ in., extend through the side sills and are securely anchored to the underside. Like the underframing, the body framing is built completely of teakwood and is of the following dimensions: Corner posts, $4\frac{13}{32}$ in. thick; side posts, 2½ in. thick; sweep of posts, 3¼ in. Mahogany is used for the concave, convex and end panels of these cars. Most of the miscellaneous equipment, such as gongs, signal bells, platform gates, drawbars, etc., were manufactured by the builder.

Length over corner posts	17 ft. 6 in.	Track to step	15⅞ in.
Length over platforms	26 ft. 10 in.	Step to platform	13 in.
Length of platforms	4 ft. 8 in.	Platform to floor	6⅛ in.
Centers of side posts	2 ft. $7\frac{9}{32}$ in.	Seating capacity	20
Width over sills	6 ft. 10½ in.	Type of trucks	Brill No. 21-E
Width over posts	7 ft. 4¼ in.	Wheel base	6 ft. 6 in.
Extreme width	7 ft. 6⅛ in.	Diameter of wheels	33 in.
From track to side sills	2 ft. 5⅛ in.	Size of journal	3½ in.
From side sills over trolley boards	8 ft. 5⅞ in.	Type of motors	GE59—2-37 hp.
From floor to center of headlining	7 ft. 7¾ in.	Wt. of carbody, less trucks, wheels and axles	13,365 lb.

THE J. G. BRILL COMPANY

Main Office
PHILADELPHIA, U. S. A.
Cable Address: "BRILL," Philadelphia

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Write the new address on the envelope in which this Magazine is received and return the envelope to the Publicity Department, The J. G. Brill Company

THE BRILL EXHIBIT AT THE CHICAGO CONVENTION

At what promises to be the best American Electric Railway Manufacturers' Association Exhibition ever held, we promise the best show we have ever made in our history. ¶ In our section at the right hand side of the main building will be four trucks, each of which marks the highest point reached in its class; the No. 27-M.C.B.3 is one of the 120 trucks built for the Cambridge Subway Division of the Boston Elevated Railway Company; the No. 27-GE short-base double truck is from an order of 600 for the Chicago Railways Company; over 6000 trucks of the No. 39-E single-motor type have been built in three years and one of the latest is shown; the "Radiax" is exhibited for the first time and is the fully developed radial axle truck. All have solid forged side frames. ¶ Four of the most novel and interesting cars which will be shown are Brill built and mounted on Brill trucks.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

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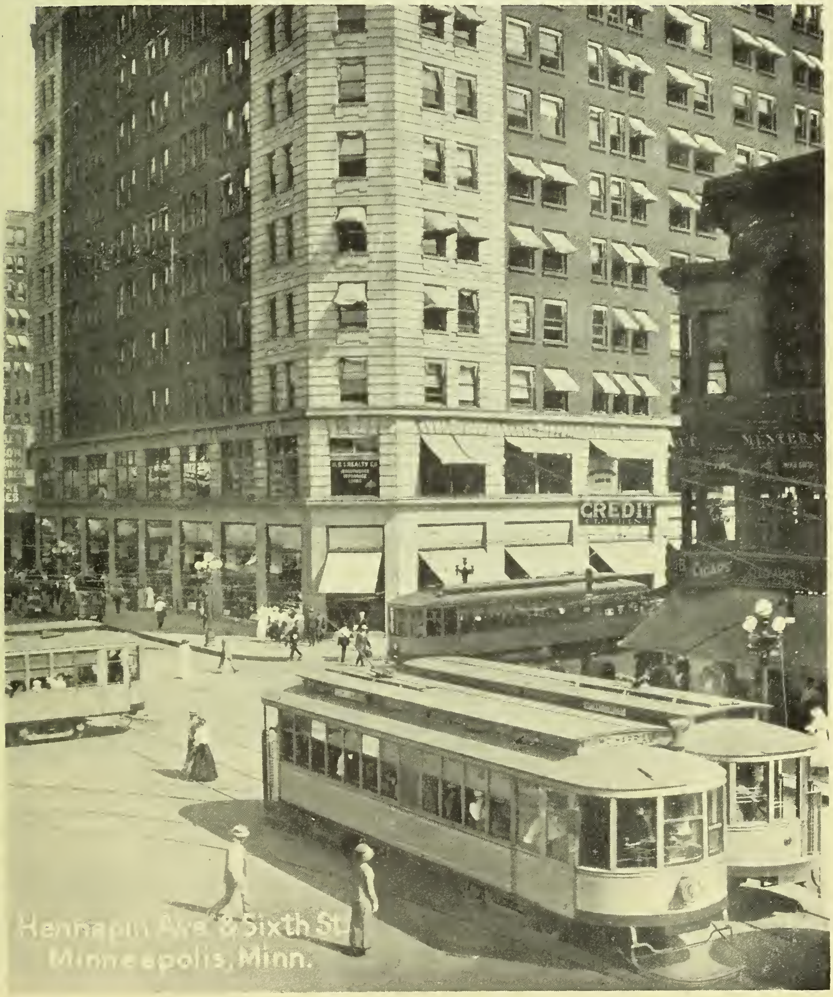
Vol. VI. OCTOBER, 1912 No. 10

BRILL MAGAZINE



CAR PARTS AND SPECIALTIES

The new Brill Order Guide No. 201 is an encyclopedic exposition of the things that make Brill cars what they are. Its conception was coincident with an effort to make the purchase of car parts easier—simpler—and its logical arrangement facilitates the interpretation of illustrations. The index is about as complete as it could be made. Wherever "slang" expressions are common, as well as accepted names, such parts are listed under both, or where more terms than one apply, the article is cross indexed. Another big help is that all figures are numbered to correspond with the correct terms that appear on the facing page. It is securely bound, like any good book, and the type selection justifies itself in pleasing appearance and readability. In all, it reflects the Brill standard—the best in everything—cars, car parts, specialties. Many copies have been sent—and more will be, with pleasure, to anyone interested in the purchase of the things within its scope.

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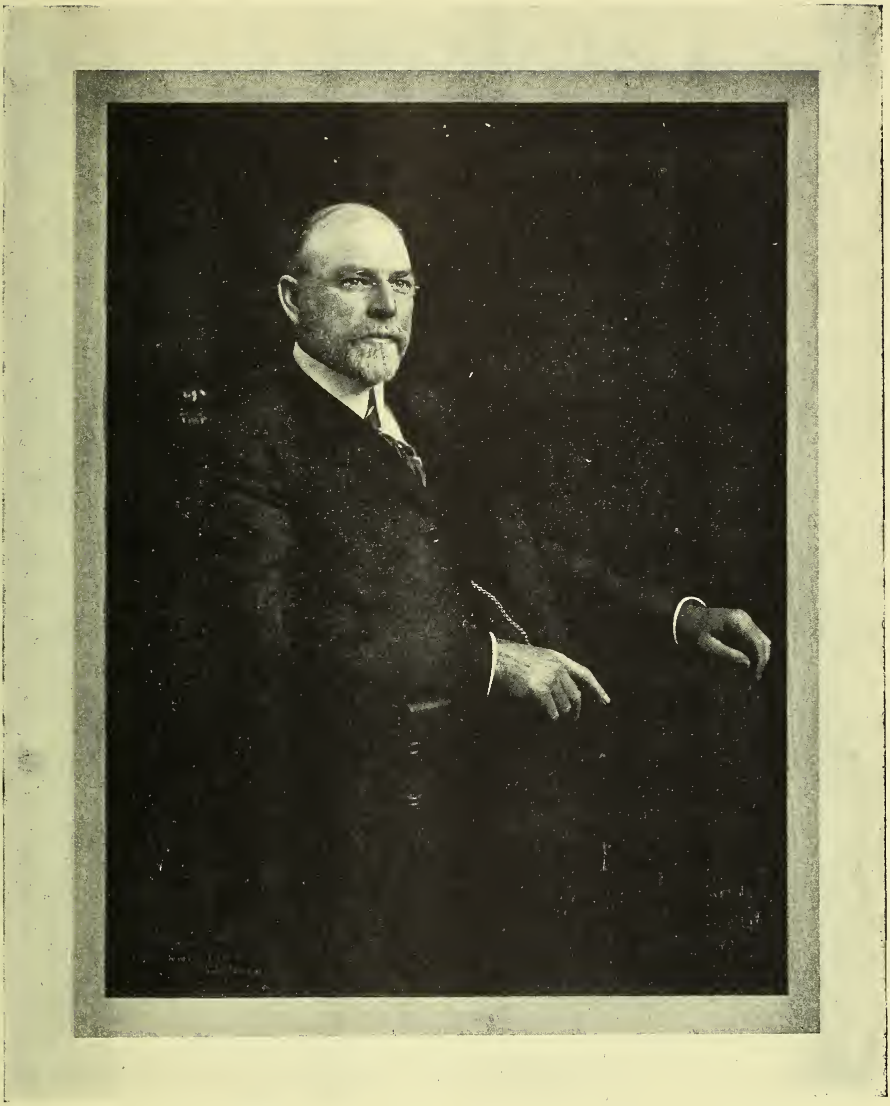


James H. McGraw

President, McGraw Publishing Company

SUPPLEMENT TO BRILL MAGAZINE
OCTOBER, 1912

BRILL MAGAZINE

Vol. VI OCTOBER, 1912 No. 10

JAMES H. McGRAW

[WITH PORTRAIT INSERT]

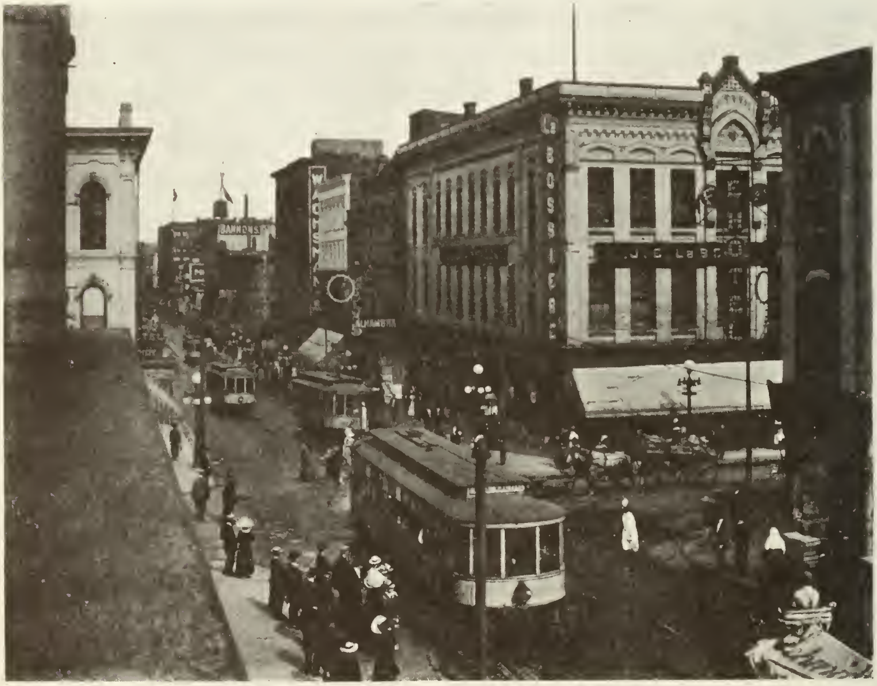
JAMES HERBERT McGRAW, president of the McGraw Publishing Company, was born at Panama, Chautauqua County, N. Y., on December 17th, 1860. After early training in the common schools, he graduated from the State Normal School at Fredonia, N. Y., in 1884, as valedictorian, after which he became a school teacher until 1886, when he associated himself with the American Railway Publishing Company, which at that time issued the old *Street Railway Journal*, now appropriately called the *Electric Railway Journal.* His ability brought him the sole ownership and publishing of this periodical in 1889, shortly after which he did much through his publication for the adoption of electricity, which had been looked upon with distrust, as the motive power for urban operation. In 1896 he became owner of the *American Electrician*, a monthly devoted to electrical and mechanical engineering. Thereafter, in 1899, he consolidated the *Electrical World* and the *Electrical Engineer* under the name of the former, and in 1902 added the *Engineering Record*, one of the best-known civil engineering papers in the country, to his already large interests. Soon thereafter he formed the McGraw Realty Company to build and construct new accommodations for his publications, which, through organization and straightforward editorial policy, had grown to their present large proportions. Mr. McGraw, through his interest and the influence that he has been able to wield through his publications, has become one of the most widely-known men in the electric traction field.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

MINNEAPOLIS AND SAINT PAUL*

MINNEAPOLIS and Saint Paul, Minn.—the Twin Cities of the Northwest—are the manufacturing and commercial metropolises of all the great country—the wheat fields and the mountains—that stretches for thousands of miles to the north and the west.

With their respective populations of 301,408 and 214,744, in 1910, and their boundaries meeting about halfway between their business centers, they are both divided by the Mississippi River, which flows through them almost like a letter



Minneapolis-Saint Paul Traffic Conditions and Cars. Wabasha and Seventh Streets, Saint Paul, showing topographical character of streets

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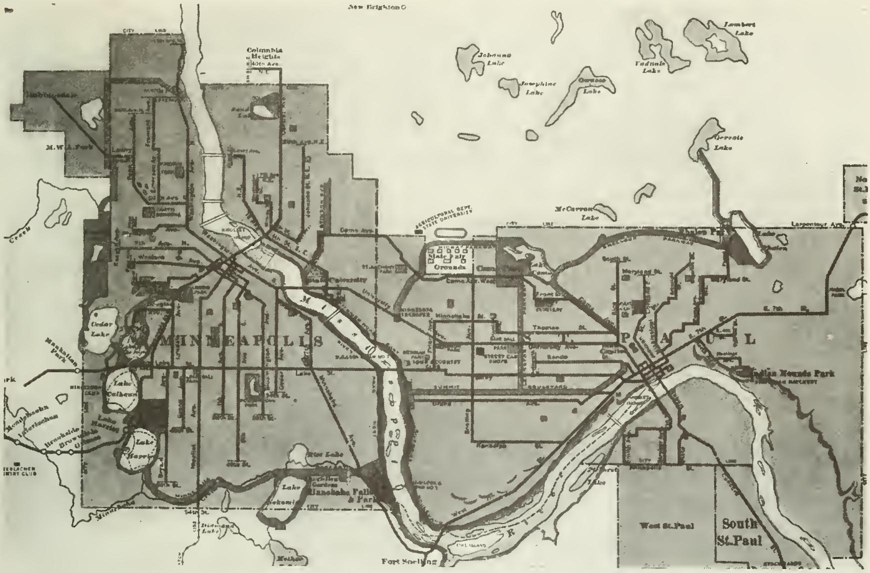
* The forty-sixth article of this series.



Map showing lines of Twin City Rapid Transit Company in Minneapolis and Saint Paul

"S" laid on its side. At Saint Paul is the head of navigation on the Mississippi—one of the points to which it owes its commercial supremacy. At Minneapolis are the Falls of St. Anthony, that alone supply over 40,000 hydro-electric horsepower; this is one of the points to which this city owes its productive supremacy, which, in 1910, represented 240,000,000 barrels of flour and 575,000,000 board-feet of lumber.

Topographically, Minneapolis presents a less problematical traction question than its neighbor, Saint Paul, in that, in its 800 to 850 feet of elevation, its generally wide streets and avenues are uniformly level; while in the latter city, the elevation of which is between 670 and 880 feet, the streets are generally narrow and crooked and are comparatively hilly, presenting a maximum grade, on the lines of the Twin City Rapid Transit Company, of 9.5 per cent for a distance of some 300 feet, and the shortest curve with a radius of 45 feet.

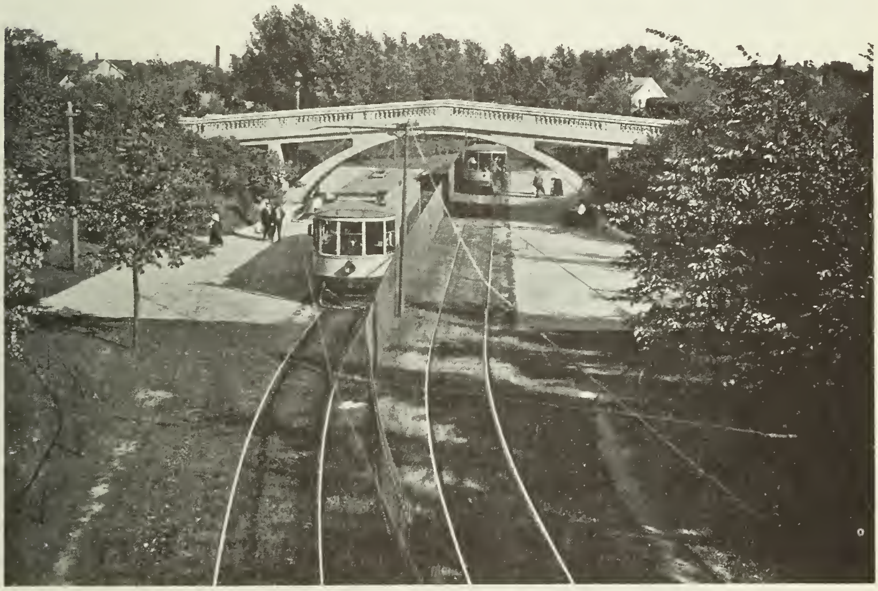
As a result of the diversified interests of the two communities, and the fact that their respective business centers are 10 miles apart, the Twin City Rapid Transit Company, which operates all electric lines, both urban and interurban, is confronted with the peculiar and unusual problem of actually serving two large cities in one. The outlying districts of each city—that is, near where their joint boundary line is—are naturally sparsely settled. The territory is traversed by the four interurban lines that serve to connect Minneapolis and Saint Paul.

Each city has what may almost be construed as an individual street railway system. The similarity of layout is remarkable, in that, in both cities, lines from all directions move toward the centers, near which are the Union and other railway stations. Here the various lines use jointly and cojointly the same tracks. Some traverse loop lines and others run through in north-and-south or east-and-west directions.

Minneapolis-Saint Paul Traffic Conditions and Cars. Hennepin Avenue and High Street, Minneapolis, showing wide boulevards

In both Minneapolis and Saint Paul, the business districts are centered along both banks of the Mississippi, with the residential sections beyond. This circumstance has made necessary the operation of 13 trans-river lines, the crossings of which are effected over six bridges, in addition to which there are two further highway and nine steam railroad bridges.

Car service in both cities is very comprehensive—so much so, in fact, that it has been stated that in the Twin Cities the ratio of car mileage to population is greater than in any other city in the country.



MINNEAPOLIS-SAINT PAUL TRAFFIC CONDITIONS AND CARS. Como Park, Saint Paul. Provision for trolley traffic at pleasure resorts

The total trackage operated by the Twin City Rapid Transit Company, reduced to a single-track basis, is 390.14 miles, of which there are 57.88 miles of single track, 24.46 miles of special and 153.90 miles of double track. Power for the operation of this extensive system is obtained from large hydro-electric plants on the river, and auxiliary steam plants.

A total car-mileage of 25,434,596 in 1911 resulted from the transportation of 154,380,730 cash and 51,844,378 transfer passengers. Much of this traffic is for pleasure, because of the magnificent surrounding country, with its hundreds of inviting lakes, and because of the myriad beautiful parks and amusement resorts within the city limits that attract so many residents as well as strangers.

The foresight and sagacity of the railway company have had much to do with the immensity of the car-riding population. Large sums of money have been, and are still being, spent in the development and improvement of beauty spots in and near the city, and in the consistent and progressive advertising of these enterprises and the best way to reach them via "Twin City Lines."

MINNEAPOLIS-SAINT PAUL TRAFFIC CONDITIONS AND CARS. State Fair grounds, showing yard facilities for heavy traffic

The illustration on the front cover shows a view of one of the busiest traffic centers in Minneapolis—the junction of Hennepin Avenue and Sixth Street. This is very near the center of the city and is typical of the situation as it must be met there. The engraving of the crossing of Wabasha and Seventh Streets, in Saint Paul, shows the marked difference in topography between the two cities and the narrower and more rugged character of Saint Paul streets. Contrasted with this, the extreme width of Hennepin Avenue at High Street, in Minneapolis, is more than ordinarily apparent.

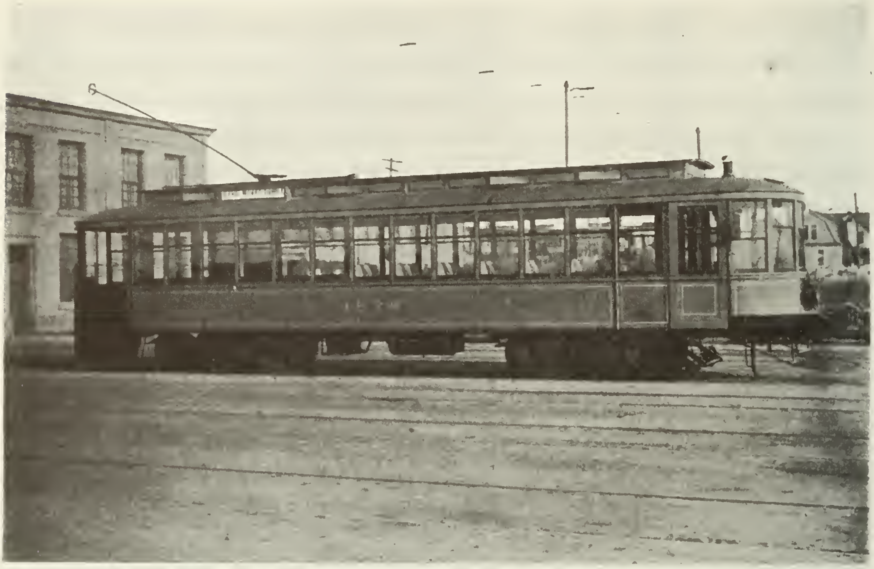
The people of these northern cities are nature lovers—pleasure lovers. In the summer they love to get out into the green of the country, and in the winter the solidly-frozen lakes, the gleaming white snow and the crisp, cold Minnesota air draw the multitudes toward them.

The picture of the station at Como Park in Saint Paul is a good example of the manner in which trolley traffic is provided to meet these peculiar urban requirements. At the State Fair Grounds many side tracks and loops provide facilities that are amply able to take care of the biggest days.

The traffic conditions, as they stand, are specific. They are peculiar to Minneapolis and Saint Paul. They savor of individuality and evidence the fact that their very special character has been the main contributing feature in developing, or rather evolving, a car that meets the conditions perfectly; that has shown itself to be efficient, not only as affects operating expenses, maintenance and earning capacity, but in the expeditious handling of large numbers of passengers with a maximum degree of safety and comfort and a minimum of sluggish movement, discomfort and inconvenience.

Originally, small single-truck cars were used, and when these proved inadequate, a large double-truck car, in which were incorporated many original ideas, was placed in service.

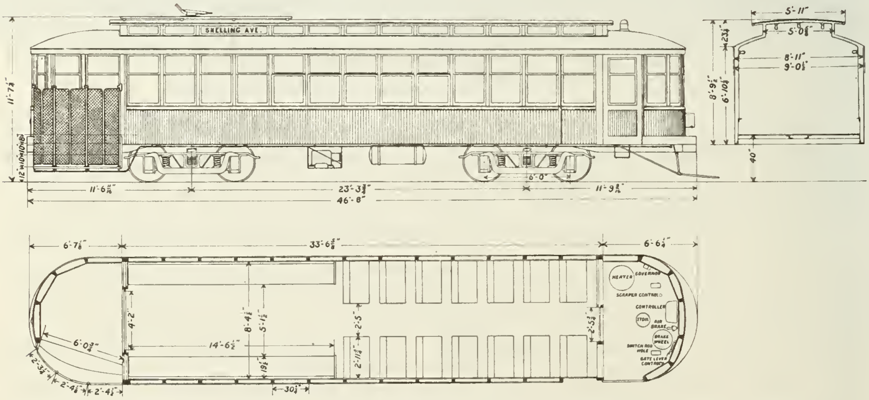
The underframing of these cars is of the composite type. It consists mainly of an oak center sill enclosed in steel channels and similar side sills that end at either end in almost semi-circular channel bumpers. The rear platform end drops five inches lower than the car floor and is supported on special channel irons. Wooden cross-braces support a sub-floor layer



MINNEAPOLIS-SAINT PAUL TRAFFIC CONDITIONS AND CARS. Standard single-end double-truck car

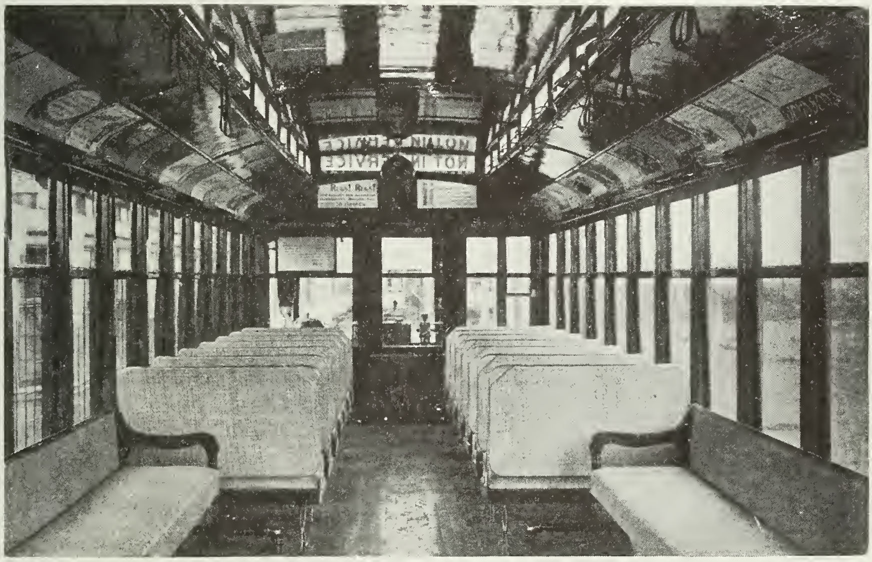
of yellow pine, over which is laid the hardwood floor. There are no floor openings of any kind. The car is built for single-end operation, the forward bulkhead having a sliding door to the motorman's cab, access to which is usually had only through a door on the right front corner of the car. The cab is never entered by passengers.

The forward half of the passenger compartment is fitted



MINNEAPOLIS-SAINT PAUL TRAFFIC CONDITIONS AND CARS. Side elevation with "Minneapolis Gate". These cars have seating capacity for 48 persons with seven transverse seats per side, and the rear half with two longitudinal seats 14 ft. 6½ in. long, so as to provide greater aisle space for the more simple handling of crowds.

In summer the cars are, to all purposes, open, the sashes being entirely removed; in the winter, on the other hand, they are so protected as to overcome the bitter northwestern cold. Double windows reduce radiation, and a hot-water heater, located in the motorman's cab, provides comfortable warmth.



Minneapolis-Saint Paul Traffic Conditions and Cars. Interior looking forward, showing arrangement of seats

For the rapid handling of large numbers of people, and also for the greater safety of operation, the so-called "Minneapolis Safety Gate" was developed by the engineering staff of the Twin City Rapid Transit Company as early as 1895. As the accompanying diagram of the floor plan shows, three-sevenths of the rear platform are not enclosed, giving an unusually wide platform opening—6 ft. ¾ in. The gate proper consists of three openings that are made up of two-hinged, wire-mesh units each, that swing outwardly. All units are opened and closed simultaneously through the agency of a very simple compound lever arrangement that is in the control of the motorman only.

In the handling of the heavy holiday traffic at important points like the State Fair grounds, the rapidity of the loading and unloading of passengers, which this gate makes possible, enables the transit system to dispatch a great number of cars expeditiously and with safety. A rather remarkable feature of the contrivance is the fact that the conductor, who is located at the rear, or within the car, has no control over the gates whatever, he simply giving the stopping and starting signals in the usual way.

Before the adoption of the Minneapolis gate, the number of accidents were frequent and often serious, but since its introduction, about 17 years ago, accidents from this source have been greatly reduced. The entering or leaving of cars in motion is impossible, because the gate units, when closed, coincide with the outside line of the lowest step, in which a very low elevation over the top of the rail has been secured.

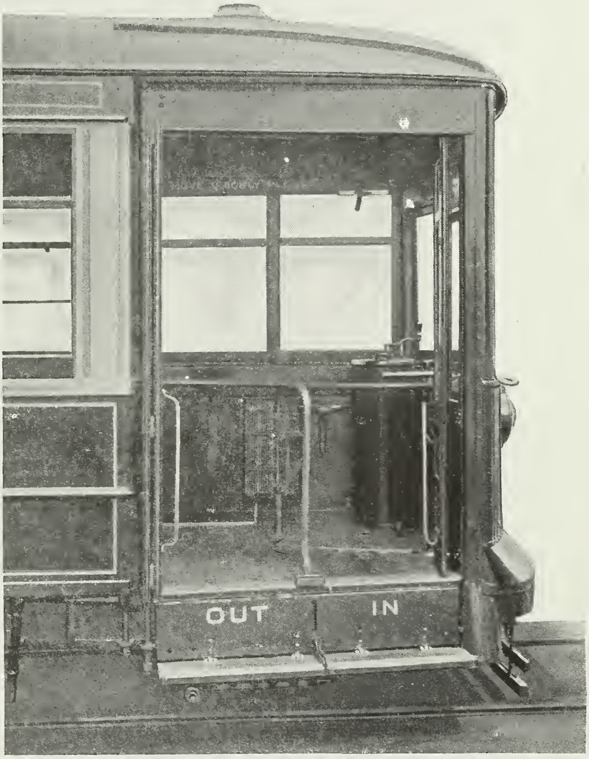
Confusion over operation between the motorman and conductor is effectively prevented in that the former has instructions never to open the gate until the car has come to a stop and never to close it until he has had the starting signal from the conductor. While the outward opening of the gate units at right angles to the carbody may appear obstructive, in a measure, it is a fact that they prevent crowding against the carbody and force involuntary good order on the part of passengers, thereby placing the conductor in full control of a situation that often requires quick action, firmness and diplomacy.

These cars have seating capacity for 48 persons, are 46 ft. 8 in. long and 9 ft. 1 in. in width, and weigh 43,700 lbs. The trucks on which they run have six-foot wheel bases to give them sufficient speed capacity to enable them to run on fast schedules on the interurban sections of the company's lines in outlying districts.

ONE-MAN PREPAYMENT CARS FOR LOCKPORT, N. Y.

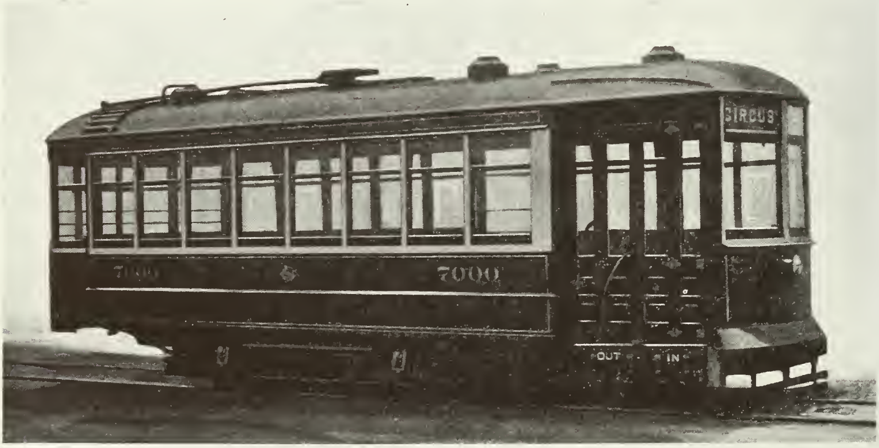
FIRST OF THIS TYPE

THE International Railway Company of Buffalo is now putting on its city lines, at Lockport, 12 one-man Nearside cars built by The J. G. Brill Company, which, although the first of this type, show a remarkably complete development in plan and detail for a form of service which has recently come to the front. The Nearside Car Company, in designing this car, had the advantage of the wide experience gained through the development of the double-truck Nearside type and its operation under a large variety of conditions in a number of cities. Few, if any, types of cars in the electric railway field, have had the advantages for quickly and thoroughly determining the merits of every feature as has the Nearside

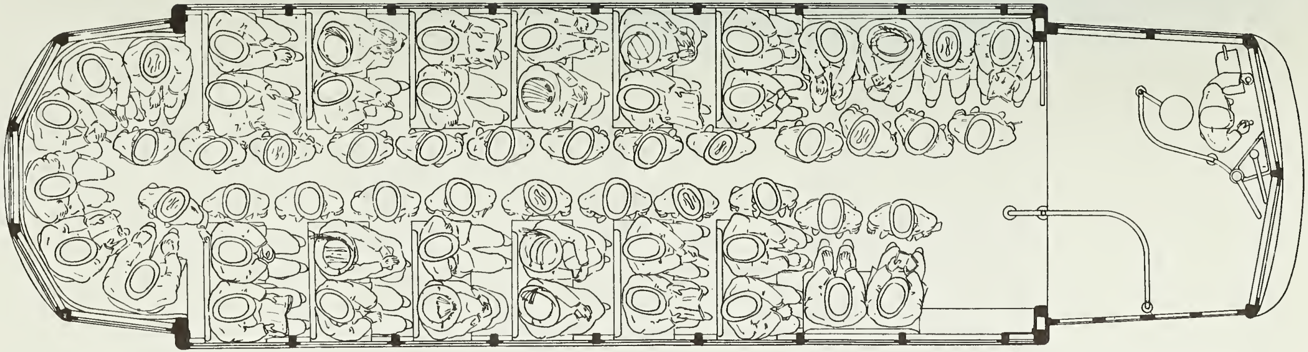


Cars for Lockport. Front platform of Nearside car for one-man operation car, and a careful study of the Nearside types by anyone at all experienced in car design shows the painstaking care and immense amount of study and experience necessary to produce a combination of features so closely applying to the needs of modern city railway requirements.

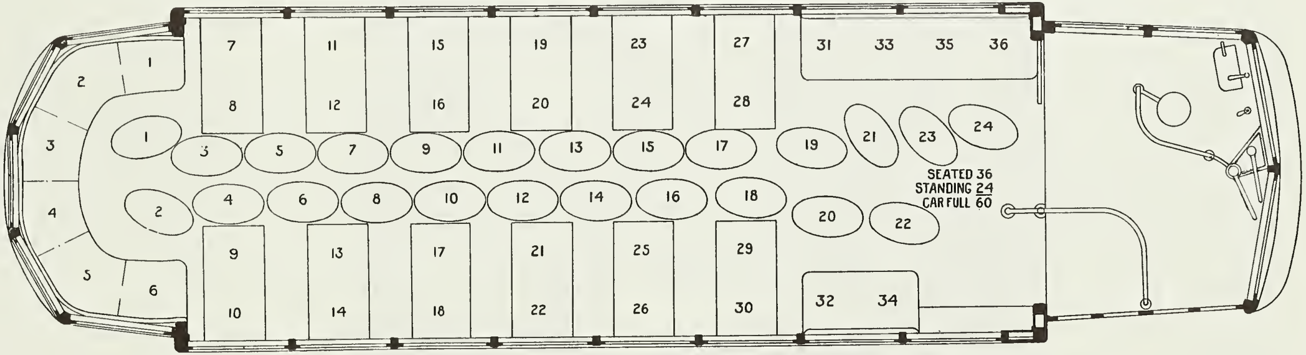
An interesting analogy is found between the bobtail car of the horse car days and the one-man Nearside car of the present. There came a time in the development of horse car traffic in many cities and towns throughout the country when a more economical means of operation became imperative to obtain capital for installing new systems and to save existing lines from bankruptcy. The initial cost of cars and horses to supply a sufficient number of units, the expense of operating with driver and conductor, and maintenance costs, the reduced life of horses on account of the excessive weight of cars, all produced a situation that required radical changing. The bobtail car proved to be the solution of the difficulty, and its adoption in all parts of the country was a factor in the history of street railway development that for many years was extremely important. In the recent years of the electric railway industry, greater attention has been given to the develop-



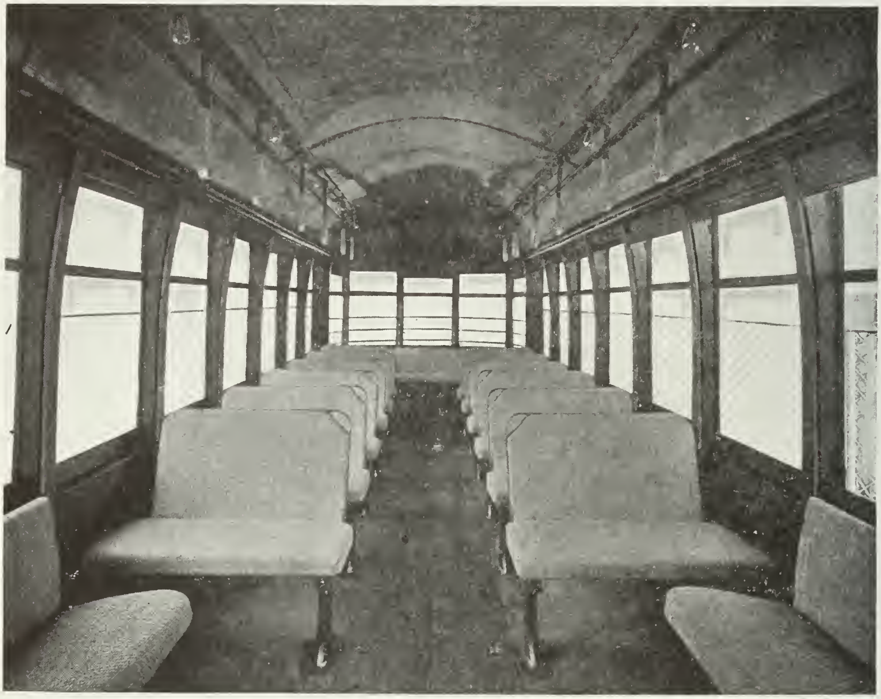
CARS FOR LOCKPORT. One-man Nearside car, 30 ft. 7½ in. long, 8 ft. wide, weight 22,620 lbs. Brill No. 21-E trucks with "Wide Wing" journal boxes



Cars for Lockport. Bird's-eye view of one-man Nearside car, showing 24 persons seated on transverse and 12 on longitudinal seats



Cars for Lockport. Diagram of number of passengers in full car, standing passengers being represented by ovals ment of more efficient and economical types of cars than formerly, and as a logical outcome of this study, the single-truck car with a one-man crew has been produced in a number of different forms. Articles on equipment of this kind have appeared in BRILL MAGAZINE during the past two years on cars for Brunswick, Ga., Missoula, Mont., Muskogee, Okla., Waco, Tex., Selma, Ala., and Freeport, Ill. As the one-man prepayment car, of whatever type, is necessarily operated at the forward end and the entrance and exit is at the forward end, it follows that the stops must be made at the nearside of the street. This brings us to the realization that the Nearside type of car is perfectly adapted for one-man operation.



CARS FOR LOCKPORT. One-man Nearside car showing Brill plain arch roof and seating arrangement

The one-man Nearside car is generally similar to the double-truck Nearside car in appearance, seating plan, platform arrangement, door and window systems, form of roof and type of ventilator. The emergency door at the rear of the longer car is omitted in the shorter, as the distance between the rear seats and the platform makes it unnecessary. As this is clearly shown in the photographs and diagrams, it is unnecessary to describe it in detail. It should be pointed out, however, that the location of the motorman-conductor gives him a clear outlook in all directions and facilitates the operation of the car to the utmost degree. The controlling apparatus, switches and signs are within easy reach. The use of air-brakes on single-truck cars is unusual, but is included in this equipment to relieve the operator of as much fatigue as possible, and to so increase his efficiency. The door-controlling handles are arranged at one end and operate the entrance and exit doors in unison or independently. The front of the vestibule has the unusual feature of being constructed with two windows, the upper sashes of which are used for illuminating destination and route signs. The side windows are of the Brill semi-convertible type with brass stiles, and each upper sash is hinged to form a waterproof joint. The seats are of Brill manufacture and are of a special type, no aisle plate being used, except that the pressed steel parts which support the back are so designed as to pass under the cushion. This seat was especially designed for the Nearside car. This is the lightest two-passenger cross seat which has ever been built and weighs but 35 lb. Five ventilators of the "Mushroom" type are used per car, and furnish an exhaust capacity considerably in excess of the requirements of the boards of health of the principal cities.

The underframe is composed of steel, with side sills of 14 by 3/16-in. plate, reinforced at the top with 2 by 1 by 5/16 and 1/4-in. angle, and at the bottom by 2 1/2 by 2 1/2 by 1/4-in. angle. End sills are formed of 9-in. channels and the crossings of 4 and 5-in. channels. The corner posts are 2 3/4 in. thick, and the side posts 2 1/2 in. thick; sweep of posts, 1 5/8 in. The floor is composed of 5/8-in. hard maple over 13/16-in. yellow pine, with 1/16-in. building felt between. From a point 6 ft. back from the front end sill the floor slopes 2 in., making the distance from the track to the folding step 13 in.; from step to platform 12 in., and from platform to car floor 6¼ in. The cars are mounted on Brill No. 21-E trucks with "Wide Wing" journal boxes, now the standard box with this truck. A wheel base of 8 ft., together with the superior spring system, give easy riding qualities and prevent any bounding motion.

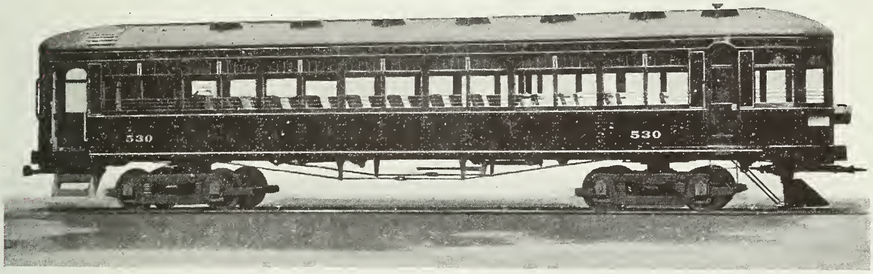
Length over corner posts	21 ft.	0 in.
Length over platforms	30 ft.	7½ in.
Length of front platform	5 ft.	6 in.
Length of rear platform	4 ft.	0 in.
Centers of side posts	2 ft.	6 in.
Width over sills	7 ft.	9½ in.
Width over posts	8 ft.	0 in.
From track to side sills	2 ft.	1⅝ in.
From rail over trolley boards	10 ft.	8¾ in.
From floor to ceiling	7 ft.	6 in.
Track to step		13 in.
Step to platform		12 in.

Seating capacity	36
Type of trucks	Brill No. 21-E
Wheel base	8 ft. 0 in.
Diameter of wheels	31 in.
Size of journals	3¾ in. by 7 in.
Type of motors	GE-200A—2-50 hp.
Weight of carbody less electrical equipment	9,500 lb.
Wt. of electrical equipment	1,100 lb.
Wt. of air-brake equipment	1,200 lb.
Weight of trucks	5,220 lb.
Weight of motors	5,600 lb.
Total weight	22,620 lb.

INTERESTING INTERURBAN CARS FOR ONEIDA RAILWAY COMPANY

PARABOLIC FRONT END

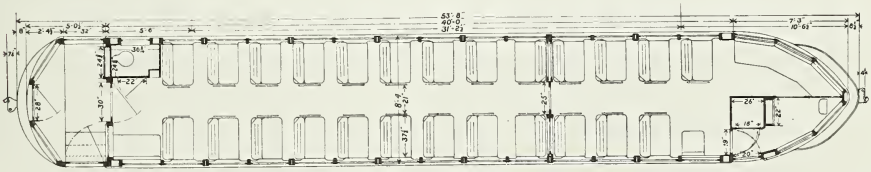
THE G. C. Kuhlman Car Company has just delivered two semi-steel interurban cars, mounted on Brill No. 27-MCB2 trucks and constructed with parabolic front ends, to the Oneida Railway Company for high-speed service. The object of this method of end construction is to reduce the wind resistance and thereby obtain an appreciable reduction in energy consumption. The cars are for operation between Syracuse and Utica, a distance of 44 miles, over the tracks of the West Shore Railroad, which are leased by the company.



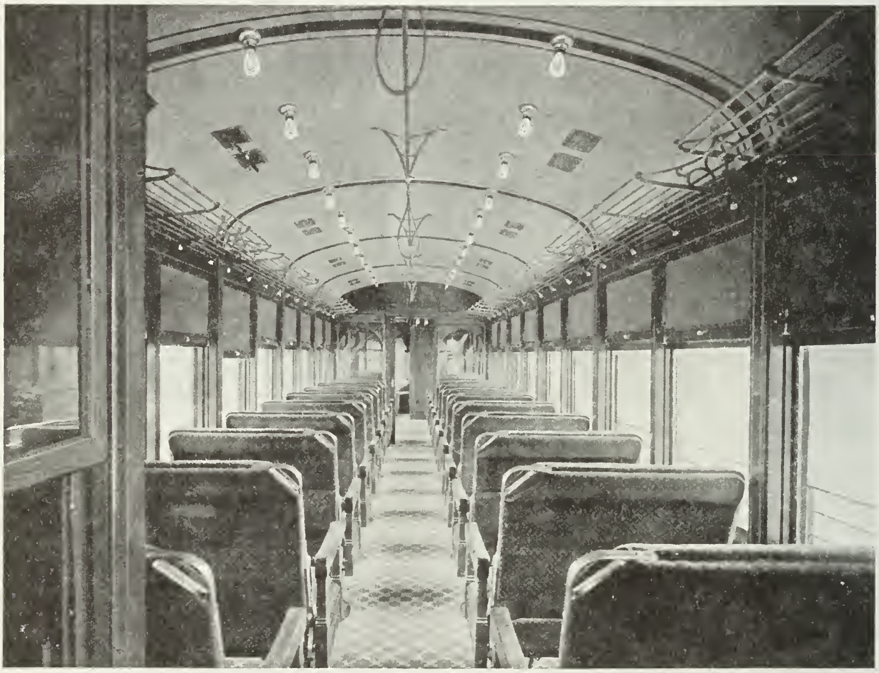
Cars for Oneida. Large interurban car with parabolic front end, 52 ft. 3½ in. long, 8 ft. 6 in. wide, weighing 32,380 lb. less electrical equipment, mounted on Brill No. 27-MCB2 trucks

The Oneida Railway Company also operates 118 miles of track, including both overhead and third rail, in central New York, connecting Syracuse, Kirksville, Canastota, Oneida, Clark Mills, New York Mills and Utica.

The use of the Brill plain arch type of roof and the method of underframe construction in these cars are features which have produced an immense saving in weight consistent with heavy service—a necessity in high-speed operation. As a portion of the lines over which these cars are being operated is within city limits, they are equipped with trolley apparatus as well as third-rail attachments for the interurban portion of the system. The windows are of the arch-top twin-window type used for this class of service. All lower sashes on both sides of the cars are arranged to raise, while the arch-top sashes, occupying the space of two windows each and glazed with art glass, are stationary. There is but one platform to these cars, that on the rear end, the floor of which is flush with the floor of the main compartment. As shown

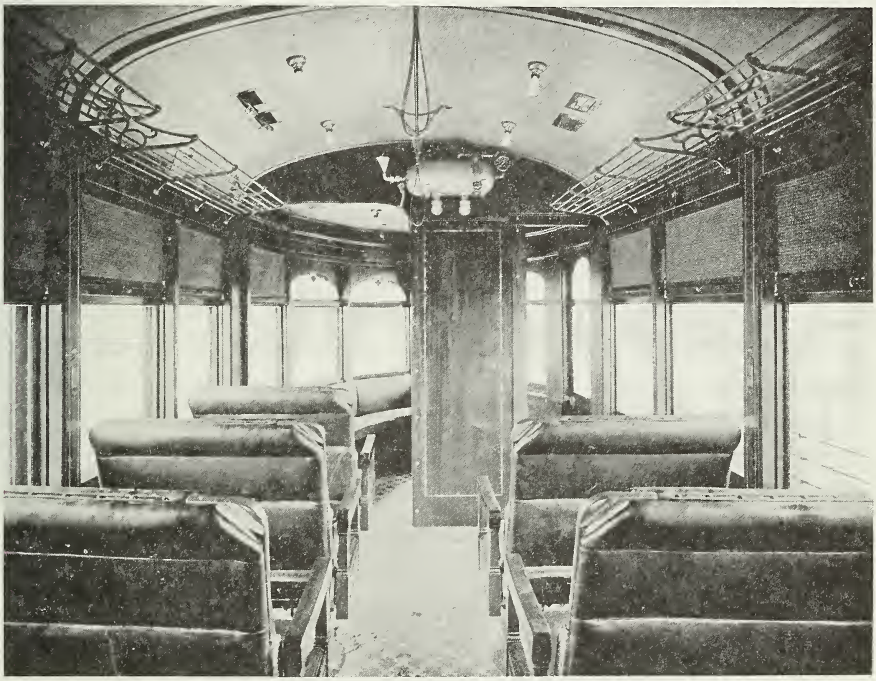


Cars for Oneida. Floor plan showing seating arrangement and parabolic front end in the photograph of the exterior, low platform steps, as in steam practice, necessitate the use of steel platform trap doors when the vestibule is closed. This platform has but one door opening, as the left side of the car is entirely closed. This door opening is the only means of entering and leaving the car for passengers, and is provided with a single hinged door which swings back against the bulkhead; this door is glazed with 3/16-in. plate glass with arched top and is held in position when open by an automatic catch. The single hinged door in the center of the vestibule on this platform swings in and enables the cars to be coupled with trailers in train service. The sashes in the vestibule drop into pockets, while the lower part on both sides of the door is sheathed with 12-gauge sheet steel.



CARS FOR ONEIDA Interior showing toilet room in rear left hand corner and showing Brill plain arch roof

As can be seen in the diagram on page 305, the cars are divided into three passenger compartments, the observation, smoking and main, in addition to which there are a motorman's cab, heater and toilet rooms. A longitudinal seat, with capacity for four passengers, arranged on the left side of the parabolic end, to the extent of three windows, constitutes the observation compartment, while the right side is devoted to a motorman's cab and heater room. A single door, 20 in. wide, and swinging inwardly, affording access to the motorman's cab from the exterior, is hinged to the body corner post. The observation-compartment side of the cab is fitted with two stationary sashes, with brass stiles, so as to give the motorman a view of both sides of the track. The heater room, located directly behind the motorman, is constructed of mahogany and lined with ¼-in. asbestos for protection against excessive heat; a swinging door, 18 in. in width, opens into the motor-



CARS FOR ONEIDA. Parabolic front end observation compartment with seats occupying left half and motorman's cab, right man's compartment and has a screened opening, 12 by 14 in., in the lower part. Heater pipes extend into the motorman's cab and toilet room in the rear of the car, and may be readily removed for repairs when necessary. The heater in this room is located on top of the coal box, and a section of it may be seen in the photograph of the observation and smoking compartments on page 307, on the heater room partition just below the headlining. The smoking compartment, which adjoins the observation compartment and the heater room, provides seating accommodation for 15 smokers, the seating arrangement consisting of seven transverse seats and a single longitudinal seat 18 in. wide. Match scratchers are provided on all posts in this compartment. The partition between the smoking and main compartments is provided with a door opening, 25 in. wide, and a single sliding door fitted with 3/16-in. plate glass. On each side of the door is a sash fitted with same thickness of glass as the door and with brass stiles. The seats in the main compartment accommodate 38 passengers, nine of the transverse type being on each side of the aisle, with a longitudinal seat in the rear right-hand corner, which seats two passengers. A toilet room is located in the rear left-hand corner of this compartment and is of the most sanitary type, the interior being lined with Gardner artificial lumber and painted white. The flooring in all compartments, except the heater room, as well as the rear platform, consists of 13/16 in. yellow pine covered with interlocking elastic tiling; while the floor of the heater room is of double thickness wood and is flush with the interlocking tiling in the smoking compartment.

Length over corner posts	40 ft. 0 in.	From track to step	16 in.
Length over platform	52 ft. 3½ in.	Seating capacity	57
Length of observation compartment	7 ft. 3 in.	Type of trucks	Brill No. 27-MCB2
Length of smoking compartment	11 ft. 9 in.	Wheel base	6 ft. 6 in.
From track to side sills	3 ft. 9⅞ in.	Diameter of wheels	37 in.
From floor to center of headlining	8 ft. 2⅛ in.	Weight of carbody, less electrical equipment	32,380 lb.
		Wt. of trucks, less wheels and axles	10,880 lb.

AMBULANCE CAR FOR BAHIA, BRAZIL

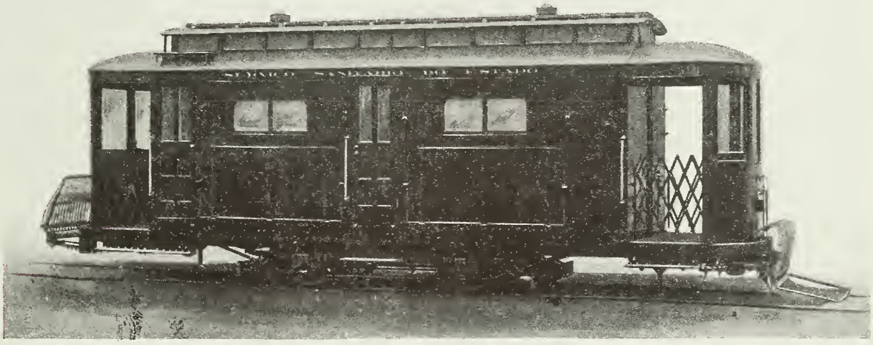
FIRST OF TYPE EVER USED

LA Compania Linha Circular, which operates the street railway system in Bahia, Brazil, ordered a car for ambulance purposes from The J. G. Brill Company, which is the first of its kind to have been built.

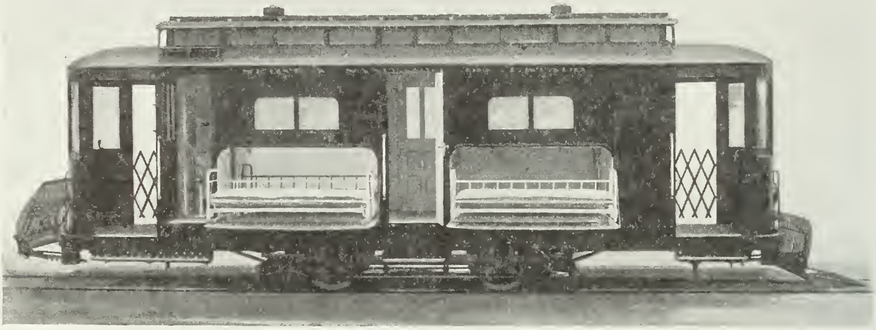
The car will be used for the transportation of patients suffering from both contagious and non-contagious diseases, to outlying hospitals that cannot readily be reached by other means.

The builder was confronted with a rather difficult and unusual problem in the design of this car—first, because no similar car, from which experience might have been gained, had been built; secondly, because of peculiar local conditions, and thirdly, for the reason that provision had to be made for the complete isolation of the patients, thorough fumigation and the accommodation of nurses and physicians.

Mounted on Brill standard No. 21-E single-trucks, the steel underframe supports an all-steel car body, 21 ft. long,



CAR FOR BAHIA. Ambulance car, showing compartments closed. Length, 30 ft,; width, 8 ft.; weight, 24,970 lb. mounted on Brill No. 21-E truck



Car for Bahia. Showing two hospital compartments open, with beds drawn out for reception of patients

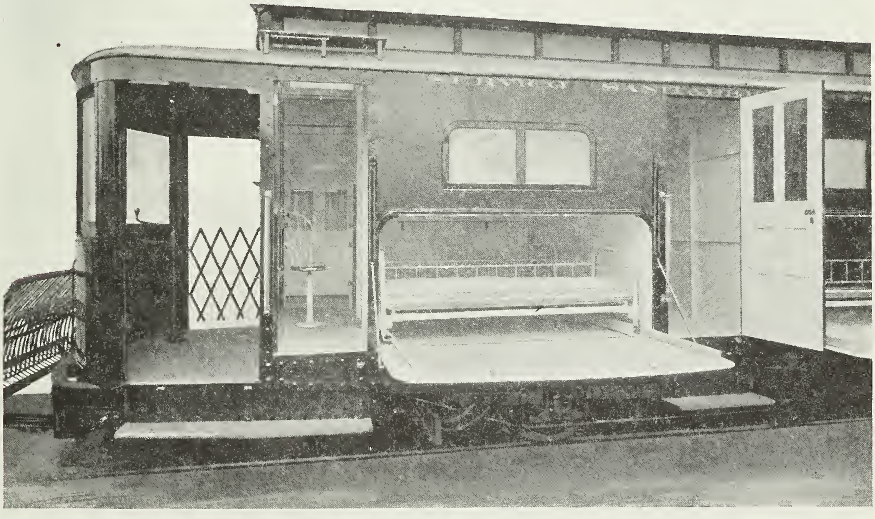
that is divided into three major compartments, the two largest of which are sub-divided into a large and a smaller one, making, in reality, a five-compartment car, not counting the two platforms for crew. The compartments all take in the full width of the car and are all duplicated, except the central fumigating compartment, of which there is but one.

The central compartment, which is 2 ft. 11⅝ in. long, contains an apparatus for fumigation. It is hermetically sealed from the rest of the car, except for a hole through each transverse wall, through which fumigation is done, so as to obviate the necessity of any person's entering the hospital compartment. Access to the compartment may be had by means of steps and through hinged doors on either end, the panels of which hold two sheets of clear glass each, in the upper halves.

The hospital compartments, which are 6 ft. 6 in. long, hold each two iron beds that are equipped with four rubber-tired rollers, springs and mattresses, and have a railing 6 in. high on their inner sides. The outer side-walls of these compartments are arranged so that they may be lowered outwardly to a horizontal position. At the extremities of each compartment, on the exterior of the walls, channel guides are affixed that hold toggle joints with "T" heads, which, when at their lowest points, hold the horizontally dropped wall, which has now, in reality, become an extension of the car floor, in that position by means of iron supporting rods, as shown in the illustration. "Z" bars are riveted to the upper surfaces of these hinged wall-doors to act as tracks in pulling the beds out of the carbody to receive patients. When the compartment is closed, light is secured through double-paneled wire glass windows, frosted on the inside, and located above the beds, one of which is on either side of each compartment, as well as through stationary glasses in the monitor deck sash.

Under each bed, at the end near the center of the car, is a ventilating hole, 8¼ in. in diameter, which is covered by a removable register, that may be opened and closed. Cotton or any other fabric may be placed within this to distill the air before it enters the compartment.

The front wall of each hospital compartment contains a door, 24 in. wide, that leads into the nurses' compartment, which is, in reality, a subdivision of the isolated space that



CAR FOR BAHIA. Detail of hospital compartment and subdivision for nurse, with revolving chair and medicine chest makes up both. Looking forward, on the right side, is a metal case with glass swinging doors for the reception of medicaments and such surgical instruments as may be necessary. In the center, facing the front door, is a revolving metal chair with back, for the accompanying nurse. The inwardly swinging door on the left side admits to this and the hospital compartment from the exterior. A steel bulkhead, with no openings of any kind, separates the carbody from the vestibule platform at this point. The platform is the usual one of all-steel construction and is fitted with pantagraph gates over the steps.

Monolith flooring and aluminum headlining are used, not alone for reasons of sanitation, but also owing to their good wearing qualities in the Brazilian climate on the south Atlantic coast.

In order to eliminate any possibility of infection on the part of the crew, regular signal bells with cord are not used, as they would necessitate holes in the walls. This feature has been overcome in the adoption of electric bells with push-buttons.

The entire interior of the car, including walls, headlining, beds, chairs and cabinet, is enameled in white; the stretchers, that are furnished also, are nickel, and the exterior of the car body is painted bottle-green, with purple striping and gilt lettering.

The car is equipped with air, electric and hand-brakes and has all other appurtenances — electric illumination, headlights, platform gong and sand boxes — that are usual in car equipment.

Length over corner posts	21 ft. 0 in.	Type of truck	Brill No. 21-E
Length over platforms	30 ft. 0 in.	Wheel base	7 ft. 0 in.
Length of platforms	4 ft. 6 in.	Diameter of wheels	33 in.
Length of hospital compartment	6 ft. 6 in.	Size of journal	3½ in.
Width over sills	8 ft. 0 in.	Type of motors	GE-67—2-40 hp.
From track to side sills	2 ft. 2⅝ in.	Weight of carbody less elec. equipment	14,500 lb.
Track to step	17½ in.	Weight of electrical equip.	1,000 lb.
Step to platform	10 in.	Weight of trucks	5,700 lb.
Platform to floor	7⅛ in.	Weight of motors	4,770 lb.

NEW EQUIPMENT FOR EVANSVILLE RAILWAYS COMPANY

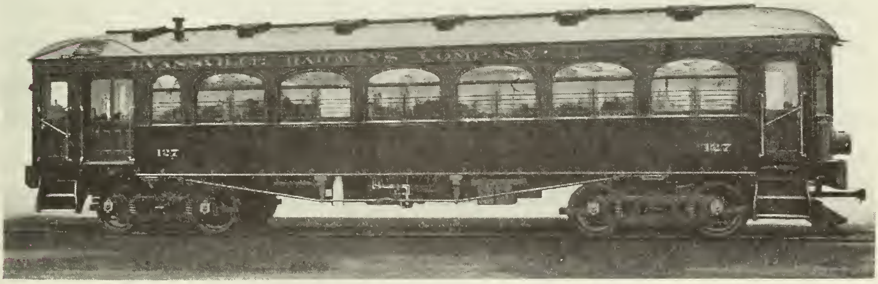
BRILL No. 27-MCB1 TRUCKS

AMONG the most modern types of interurban cars built at the plant of the American Car Company within the past year, and quite a number have been built, were three combination passenger and baggage cars, shown in the accompanying engravings, and one baggage and express car, which have just been delivered to the Evansville Railways Company.

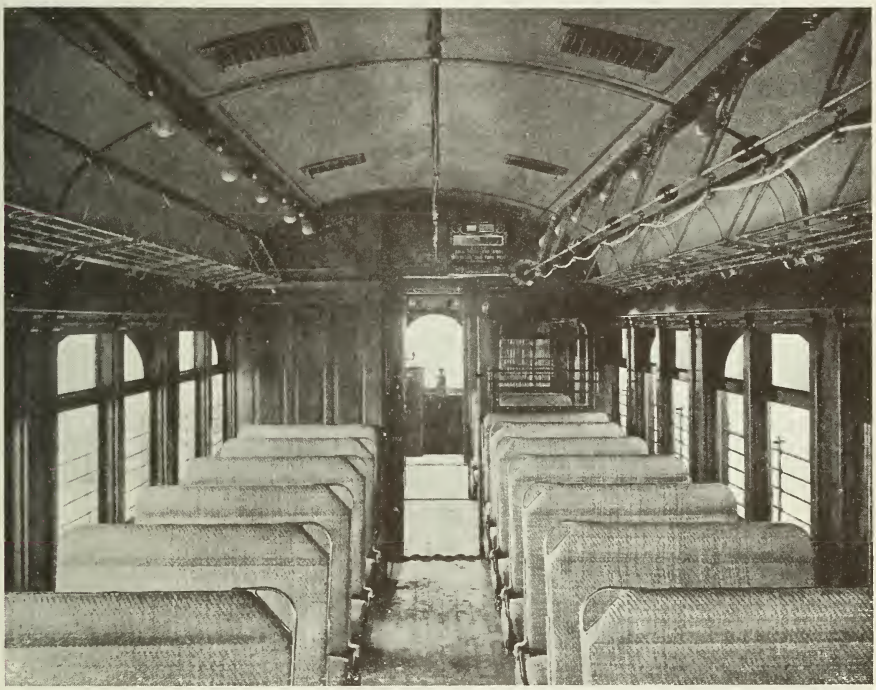
The Evansville Railways Company operates 72 miles of track, connecting Evansville with Mt. Vernon, Booneville, Newburg, Grandview, Rockport and a number of smaller towns in southwestern Indiana, and leases a section of the Illinois Central Railroad, 6½ miles long, between Evansville and Henderson, Ky., just across the Ohio River.

A large proportion of the freight handled by this road consists of miscellaneous produce raised along its lines.

The combination passenger and baggage cars are mounted on Brill high-speed No. 27-MCB1 trucks, and are for operation



CARS FOR EVANSVILLE. Baggage and passenger compartments. Length of car, 48 ft. 8 in.; width, 8 ft. 10½ in. Mounted on Brill No. 27-MCB1 trucks at either end. The windows are of the double-sash Pullman type, one upper sash extending across two lower sashes which may be raised to the extent of 20 in. The center sash in each vestibule is of the single type and drops into a pocket, while the two outer sashes in each vestibule are double, the lower portion being arranged to raise. The sides of the cars beneath the windows are sheathed with two layers of tongue-and-groove poplar boards, the inner layer placed horizontally and the outer vertically, both being fastened to the body and underframing in a very substantial manner, while the vestibules beneath the windows are sheathed with one layer of vertically placed poplar boards. The platforms are 4 ft. 3 in. in length and have a single swinging door, 30 in. wide, on each side; all four step openings are provided with triple steps of steam-car design. The interiors are divided into three separate compartments. The main compartment is 24 ft. 4¾ in. long and seats 34 passengers, there being eight transverse seats and a longitudinal seat for two passengers on one side, and seven transverse seats and a longitudinal seat for two passengers on the other. All seats in this compartment are of the Brill "Winner" type of recent design, constructed with pressed steel pedestals, aisle and wall plates, and have high roll-top reversible backs. In one corner, directly opposite the last transverse seat, is a toilet room. The interior of this toilet room presents a striking appearance, the walls to the height of 24 in. being covered with imitation tile, while the floor is covered with hygienic patented floor covering. The single window in this room is glazed with florentine glass, as may be seen in the photograph of the exterior. To the right of the door which affords entrance to this toilet room, an alcove is arranged for a water cooler. The partition between the main and the smoking compartments is equipped with a single sliding door, 24 in. wide, as well as a single sash, which is stationary, on the side opposite the toilet room. Next to the main compartment is the smoking compartment, 8 ft. in length, which is equipped with six transverse seats, those against the main and baggage compartments being stationary, while the two center seats are reversible; these seats are of the same type as those in the main compartment. The smoking and baggage compartments are connected by a 24-in. swinging door, on both sides of which are located single stationary sashes. The baggage compartment, 7 ft. 9¼ in. long, is equipped with longitudinal slatted



CARS FOR EVANSVILLE. Passenger compartment, seating 52 passengers, and showing baggage compartment through door

wood seats in two sections, on each side, the section toward the platform being hinged to the bulkhead and arranged to raise to allow the loading and unloading of baggage through the 42-in. sliding door on each side, while the other sections are hinged to fold back against the car sides. The seat section in the rear of this compartment, to the right when entering from the platform, may be removed and a heater substituted in cold weather. The seats accommodate six passengers and are used only when necessary and when no baggage is carried. Both bulkheads are provided with 34-in. sliding doors. All three compartments are finished in light quartered oak.

The underframing is made up of yellow pine side sills, 4½ by 7½ in., reinforced with 18 by ⅜-in. steel plate; end sills of white oak, 5 by 6 in., plated with 6 by ½-in. steel plate and reinforced with 7 by 3½ by ½-in. angle iron; two center and two intermediate sills of 6-in. 12¼-lb. I-beams with yellow pine fillers; all crossings are of white oak, 6 by 3½ in. Two truss rods, 1½ in. diameter, are located under each side sill and extend from bolster to bolster. The upper structure is built of ash corner and side posts, every second post being of double construction and securely bolted to the 18 by ⅜-in. steel sill plate.

Length over corner posts	40 ft. 2 in.
Length over platforms	48 ft. 8 in.
Length of platforms	4 ft. 3 in.
Length of baggage comp.	7 ft. 9¼ in.
Length of smoking comp.	8 ft. 0 in.
Centers of side posts	2 ft. 8 in.
Width over sides	8 ft. 10½ in.
From track to side sills	3 ft. 5½ in.
Side sills over trolley boards	9 ft. 3¼ in.
From floor to center of headlining	8 ft. 1 9/16 in.
Track to step	16 15/16 in.
Risers	10¾ in.
Seating capacity	56
Type of trucks	Brill No. 27-MCB1
Wheel base	6 ft. 6 in.
Diameter of wheels	36 in.
Size of journals	4¼ in. by 8 in.

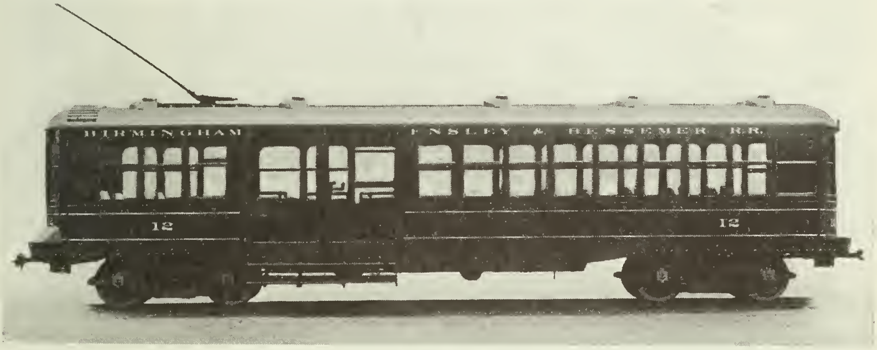
* * *

NOVEL INTERURBAN CARS FOR BIRMINGHAM, ALA.

SEPARATE WHITE AND NEGRO COMPARTMENTS

IN ten steel-underframe, center-entrance interurban cars built by the Wason Manufacturing Company for the Birmingham, Ensley & Bessemer Railroad, which are for single-end operation, a very interesting and novel car has been produced.

Mounted on Brill No. 27-MCB1 trucks is a steel underframe, the fish-belly side sills of which measure 21½ in. by 5/16 in. and are reinforced at top and bottom by angles which are riveted on through the entire length. Owing to the existence of an 8 ft. 6-in center entrance near the rear end, on the right side, the deep section of the side sill is extended to a point somewhat beyond the forward wheels of the rear truck, to compensate for lack of strength due to the consequently lessened self-sustaining ability of the carbody at this point. The center stringers are two 5-in. I-beams that run through between the bumpers. In order to distribute, evenly, through the entire underframe any possible longitudinal strains, diagonal braces of 4-in. by 5/16-in. steel plate run from the ends of each body bolster to the meeting point of the stringers and bumpers, upon the outer ends of which anti-climbing devices are secured. Fifteen steel channel crossings, in addition to the two composite body bolsters, the centers of which are 30 ft. 1 in. apart, constitute the lateral bracing.



CARS FOR BIRMINGHAM. Interurban "Jim Crow" car showing quadruple center door. Mounted on Brill No. 27-MCB1 trucks

The body framing is very simple and strong, the corner and side posts being cut of ash to 3⅝-in. and 2¾-in. thickness, respectively, there being 17 of the latter on the left and 14 on the right side, for allowance for the center entrance. At the rear end the framing holds a vestibule with three windows, and the front end is arranged for a vestibule with a window on each side and a central outwardly swinging door. The framing for the Brill plain arch type of roof is in the form of one-piece concealed forged steel carlines. A yellow pine floor is used throughout.

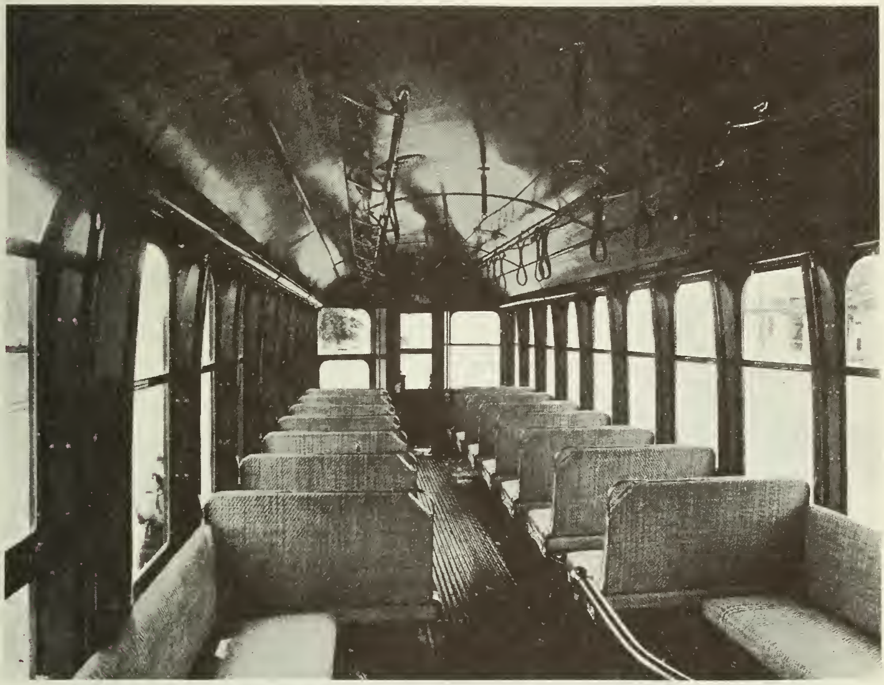
In the forward compartment, 25 ft. 1½ in. in length, which is reserved for white passengers, there is a motorman's compartment, that occupies the middle one-third of the front vestibule and extends back into the compartment a distance of 3½ ft. On the forward ends of each of the longitudinal sides of this compartment there is a window, 12 in. wide, to afford a side outlook. The forward end, which is the middle one-third of the vestibule, is a door swinging outwardly. In the wall leading to the passenger compartment there is also a door, but this swings back into the motorman's space.

The white passenger compartment seats 38 people, having seven transverse stationary-back seats on each side of the aisle, together with two longitudinal seats, seating two passengers each, at the forward end, and two longitudinal seats at the rear, one with a capacity for two passengers and the other for three. To the latter is hinged another seat with capacity for one person.

The negro compartment, which is 11 ft. 5½ in. long, comes behind the compartment just described and is separated from it by a sheet-iron partition that runs to within about 3 ft. 4 in. of the left carside, and forms, at the same time, the dividing center of the center entrance. With exception only in the addition of a curved rear seat, with room for six passengers, running the width of the body and backed by the rear vestibule, its shorter length, and a seating capacity of but twenty, the negro, or rear, compartment is substantially the same as the other.

The center entrance is equipped with a double folding step, giving a very low step elevation, and with four sets of double folding doors. This arrangement affords separate means of ingress and egress for white and negro passengers, the two mean openings being used for entrance and the two extremes for exit. Doors and steps are operated in unison by the conductor, who controls them through a system of levers. Railings guide passengers to the proper door openings.

The cars are provided with the Brill patented semi-con-



Cars for Birmingham. Seating arrangement of white compartment with centrally placed motorman's compartment

vertible window system, the sash disappearing in roof pockets. All interior woodwork is in cherry, while the outer sheathing, in seven of the cars, is straight-grained ash, and in three, steel. Such details as push-button passenger signals, Brill signal bells and gongs, as well as "Dumpit" sandboxes, serve to make the cars complete in every way.

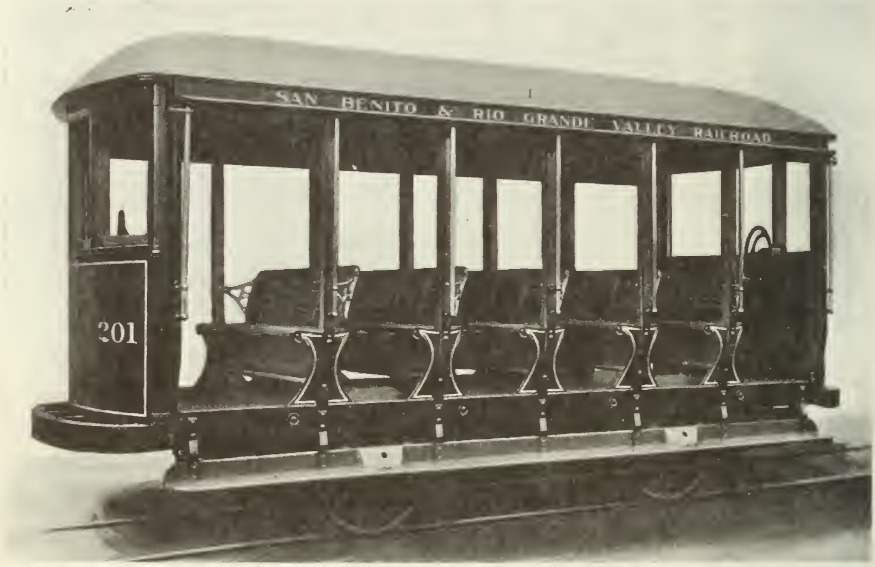
With a plain coating of olive green, relieved by the natural cherry window frames with round tops, and gilt lettering, these cars present an unusually pleasing and symmetrical appearance.

Length of body	45 ft. 1 in.
Length over platforms	45 ft. 1 in.
Centers of side posts	2 ft. 6 in.
Width of sides, including sheathing	8 ft. 4 in.
Extreme width	8 ft. 6 in.
From side sills over trolley boards	8 ft. $8\frac{11}{16}$ in.
From track to side sills	2 ft. 9¼ in.
From floor to center of head-lining	7 ft. $4\frac{15}{16}$ in.
Track to step	15¼ in.
Risers	13½ in.
Type of trucks	Brill No. 27-MCB1
Wheel base	6 ft.
Diameter of wheels	33 in.

OPEN TRAILER CARS FOR STEAM ROAD

BRILL RUNNING GEAR

THE San Benito & Rio Grande Railroad, extending from San Benito, Tex., through the Rio Grande Valley for a distance of 43 miles to Brownsville, where it connects with the St. Louis, Brownsville & Mexico Railway, is a new line which was constructed last year, and an extension of 22 miles is now under construction. A number of trailer cars of the type illustrated were purchased for this line from the American Car Company a short time ago.



Cars for San Benito & Rio Grande Railroad. A 25-passenger trailer type of rugged construction mounted on Brill running gear. Side curtains draw to the floor

These cars are mounted on Brill patented running gear with 30-in. wheels, and are constructed with the Brill plain arch type of roof. The seats are of the ash and cherry slat type, seating 5 passengers each. The interior woodwork is of ash and cherry, and the ceilings are constructed without headlinings. Three sashes in each vestibule, together with duck side curtains, completely enclose the cars during inclement weather. Both upper and underframing are constructed of wood throughout.

THE J. G. BRILL COMPANY

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G. C. Kuhlman Car Company,	**Cleveland, Ohio**
John Stephenson Company,	**Elizabeth, N. J.**
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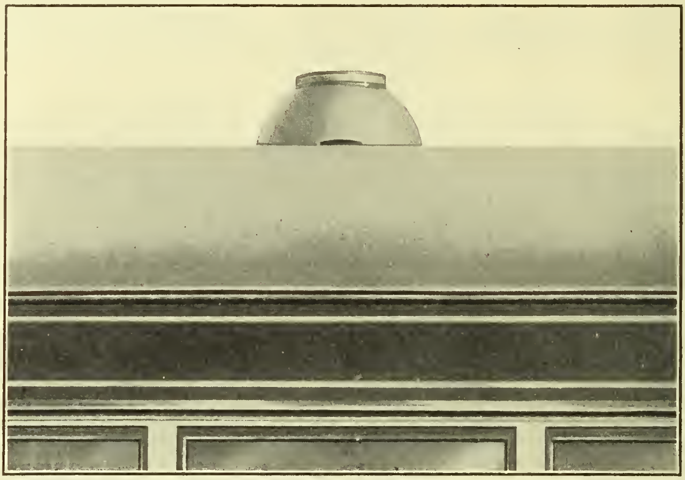

BRILL "EXHAUST" VENTILATOR

The Brill "Exhaust" Ventilator—with a total absence of moving parts—removes sufficient vitiated air from a stationary car to keep the air constantly fresh; this action is much augmented when the car is moving—and with no semblance of draughts. With the exterior air velocity at 3.17 miles per hour, over 1410 cubic feet of impure air are expelled, and at double this speed—6.34 miles per hour—it exhausts over 2820 cubic feet in each 60 minutes. This is more liberal than the usual requirements of boards of health in larger cities, as it allows 11 passengers per ventilator on the basis of 252 cubic feet of air per passenger per hour. Construction is simple—maintenance is nil—and no attention whatever is required.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

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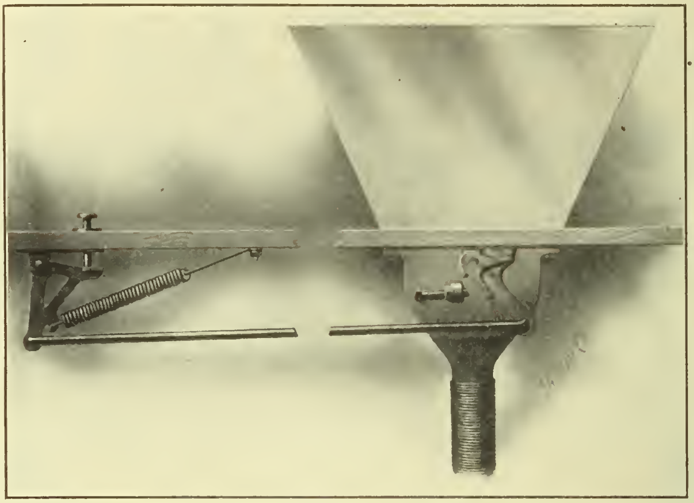
Vol. VI. NOVEMBER, 1912 No. 11

BRILL MAGAZINE



BRILL "DUMPIT" SAND BOX

(PATENTED)

Why has this box steadily held its place at the top in the face of the keenest competition, during the last ten years?—simply because continued satisfactory service, reliability under all conditions, easy operation, rugged and lasting construction are the characteristics that put it and kept it there. The picture shows the simple operating mechanism and the general form, which, with the double hopper, the positive valve and other good points, has helped make it standard on hundreds of roads. Specify "Dumpit" sand boxes on your next lot of cars or for replacements and you will always be sure to have dry sand for stopping, starting and accelerating on slippery rails.

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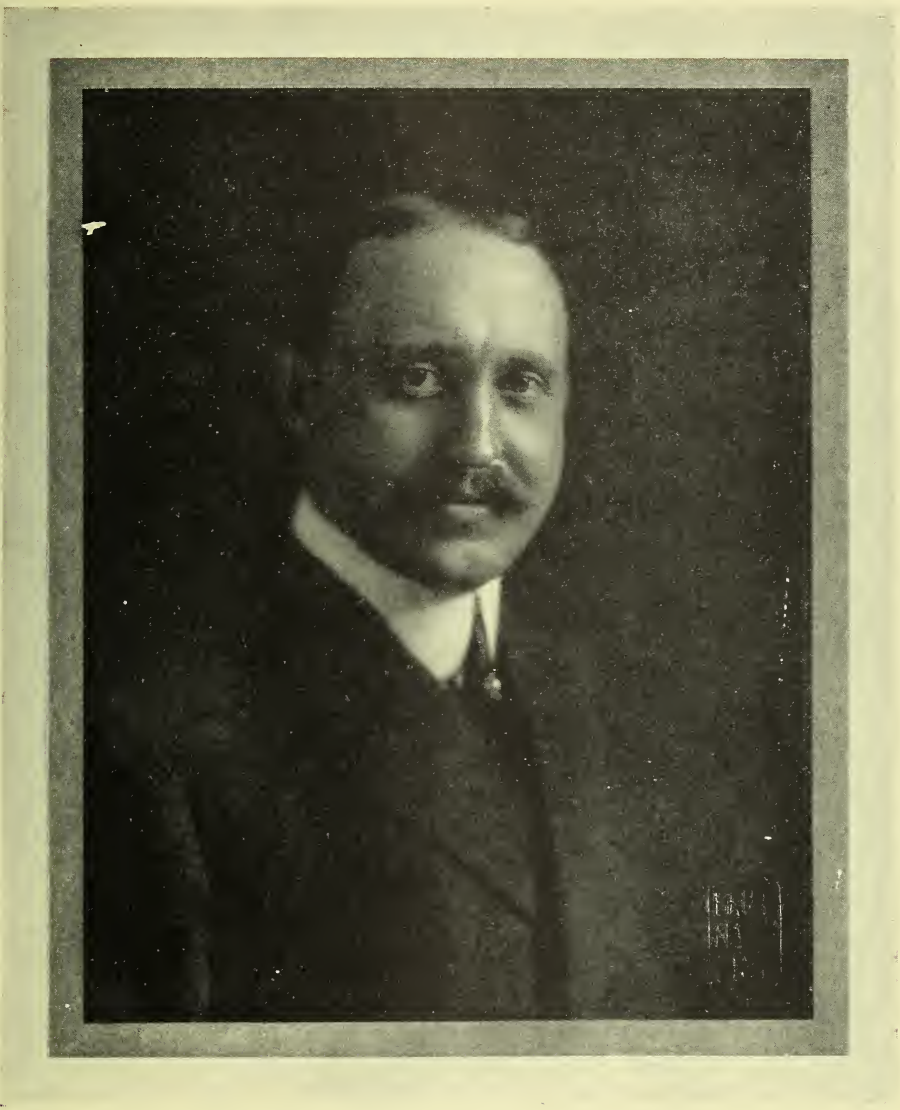

Robert I. Todd

President of Indianapolis Traction & Terminal Company
and of Interurban Systems centering at Indianapolis

SUPPLEMENT TO BRILL MAGAZINE
NOVEMBER, 1912

BRILL MAGAZINE

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Vol. VI NOVEMBER, 1912 No. 11

ROBERT I. TODD

ROBERT I. TODD, president of the Indianapolis Traction & Terminal Company, was born at Lakewood, N. J., November 29, 1869. He was educated in the public and private schools in New Jersey and Virginia, and in 1889 entered Johns Hopkins University, from which he graduated in 1893 as an electrical engineer, after taking a post-graduate course. His first position in the electric railway industry was assistant superintentent of the Eckington & Soldiers' Home and Belt Railways, Washington, D. C., which companies were subsequently consolidated as the City & Suburban Railway, and he was made general superintendent and electrical engineer. He held these offices till 1899, when he became associated with the Compressed Air Company of New York to supervise experimental work, and one year later accepted the office of mechanical engineer of the Consolidated Traction Company, Pittsburgh, Pa. He resigned this position in 1901 to become general manager and, soon after, vice-president of the Cincinnati Traction Company. In 1902 he went with the United Gas Improvement Company in the home office at Philadelphia as engineer, and the following year was appointed general manager of the Rhode Island Company, Providence, R. I., then controlled by the United Gas Improvement Company. In 1906 he was elected vice-president and general manager of the Indianapolis Traction & Terminal Company, and at the death of Hugh J. McGowan, December 19, 1911, succeeded to the presidency. The new high-tension power station, with an ultimate capacity of 80,000 kw. maximum rating, made up of 10,000 kw. steam turbine units, two of which are now in operation, was designed under his direction. Mr. Todd is a member of the American Institute of Electrical Engineers and American Society of Mechanical Engineers, and was president of the American Electric Railway Transportation & Traffic Association, 1909–1910. He is also president and general manager of the Terre Haute, Indianapolis & Eastern Traction Co.; president of the Indianapolis & Northwestern Traction Co., Indianapolis & Martinsville Rapid Transit Co., and vice-president of the Terre Haute Traction & Light Co.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

INDIANAPOLIS *

INDIANAPOLIS, the capital and metropolis of Indiana, is situated at almost the exact geographical center of the state on a level plain surrounded by low, gently sloping and wooded hills. The city has an area of 30 square miles and a population of 250,000. It is one of the most attractive inland cities in the United States, having an arrangement of streets and avenues remarkable for its orderliness, an excellent system of parks, splendid public and business buildings, and many beautiful residences. At the center is the Soldiers' and Sailors' Monument "Circle," near which four principal avenues radiate to the four corners of the city; the other streets, with few

Indianapolis Traffic Conditions and Cars. Looking northwest over the center of the city. Soldiers' and Sailors' Monument and "Circle." Terminal Building at left of monument

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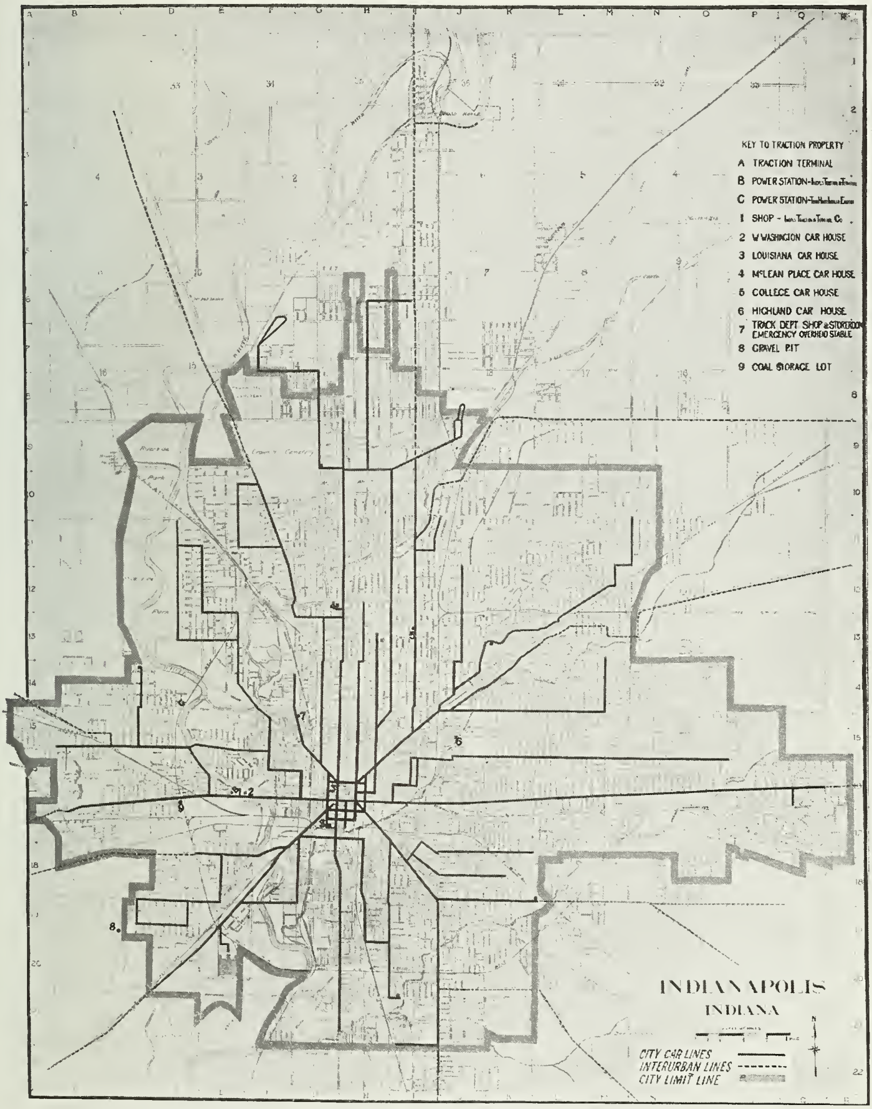
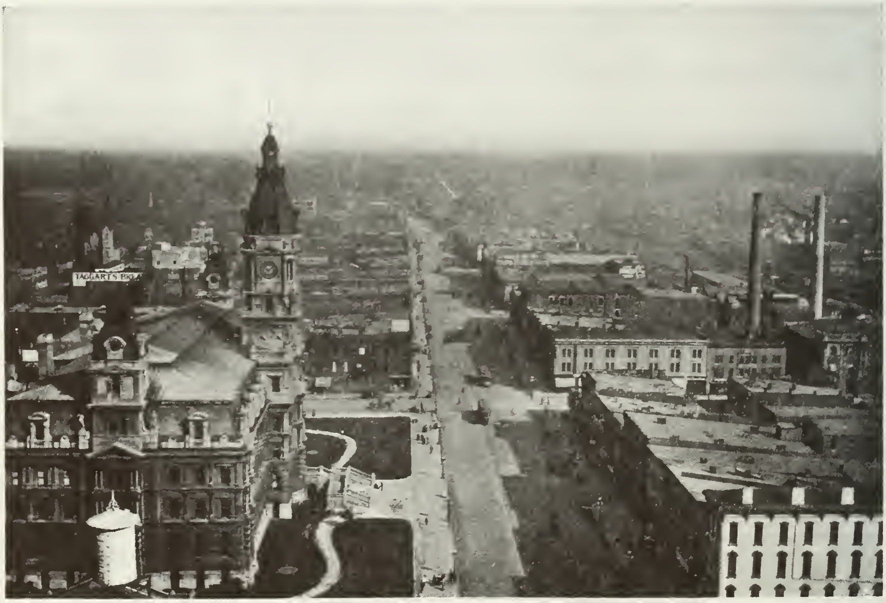
* The forty-seventh article of this series.



INDIANAPOLIS TRAFFIC CONDITIONS AND CARS. The central loop terminal system of the Indianapolis Traction and Terminal Company's lines surrounds four full blocks that enclose the "Circle" shown on the opposite page, and from which all lines radiate

exceptions, run at right angles to each other. All streets and avenues are 90 ft. wide, except Washington Street, which has a width of 120 ft. A broad, shallow river winds through the western part of the city, far enough from the business section not to interfere with the more important part of the street plan. Eight parks within the boundaries, with an aggregate area of over 1300 acres, and three just outside the limits, add much to the beauty of the city. The public buildings, constructed mostly of Indiana building stone, include the State Capitol, shown on the front cover, which occupies two acres of ground and stands on a square eight acres in extent; the Federal building, containing the post-office, customs department and Federal court-rooms, which was erected at a cost of $4,000,000; and the Marion County Court House, shown in the engraving on this page. The Soldiers' and Sailors' Monument, which stands in the circle in the center of the city, rises to a height of 285 ft. above the street level and has enormous fountains at the base, said to be the largest in the world, their capacity being 20,000 gallons per minute. The state and city institutional buildings are commodious and modern,



Indianapolis Traffic Conditions and Cars. Looking east on Washington Street from a building several blocks from the "Circle." This street is 120 ft. wide. The other streets and avenues of the city have a width of 90 ft. Marion County Court House at left

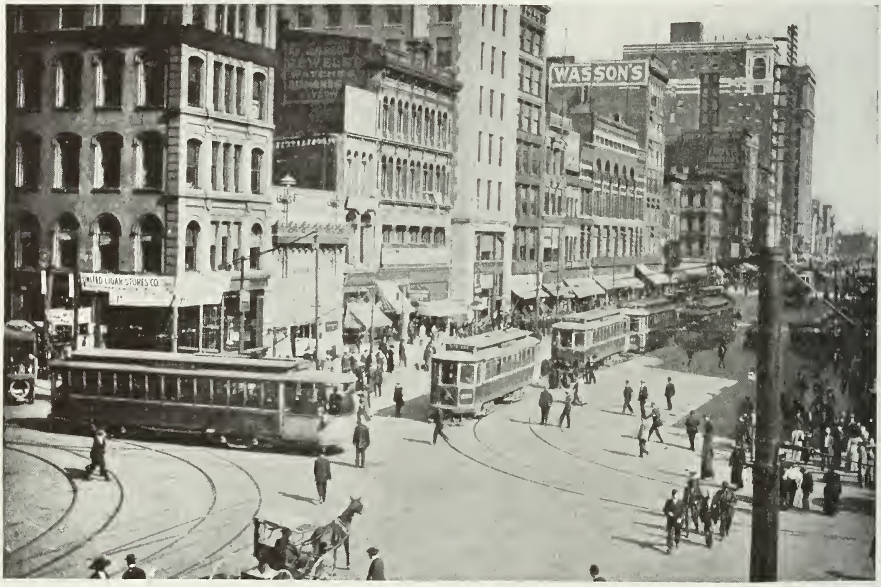
INDIANAPOLIS TRAFFIC CONDITIONS AND CARS. Looking southeast on Virginia Avenue from the same point that the preceding photograph was made. All steam lines entering the city from the east pass under the bridge shown in the photograph. This avenue is one of the four which radiate from the central district to the corners of the city

and the city is well provided with hospitals and libraries. As an educational center Indianapolis takes a high rank, having the University of Indiana, Indianapolis College of Law, Indiana Medical College, State College of Physicians and Surgeons, Indiana Veterinary College, the Indianapolis Normal School, and a number of technical and training schools.

The central geographical position and extensive railway connections, together with its proximity to important coal fields, make Indianapolis one of the foremost industrial centers of the middle west. In the live-stock industry the city stands first in the Ohio Valley and has stock yards in the southwestern part which cover more than 100 acres. Slaughtering and meat packing have, from an early date, been the principal industries, and of recent years the manufacture of automobile bodies, motors and accessories has become so large as to rival other chief industries, and today Indianapolis is said to be the second automobile-building city in America.

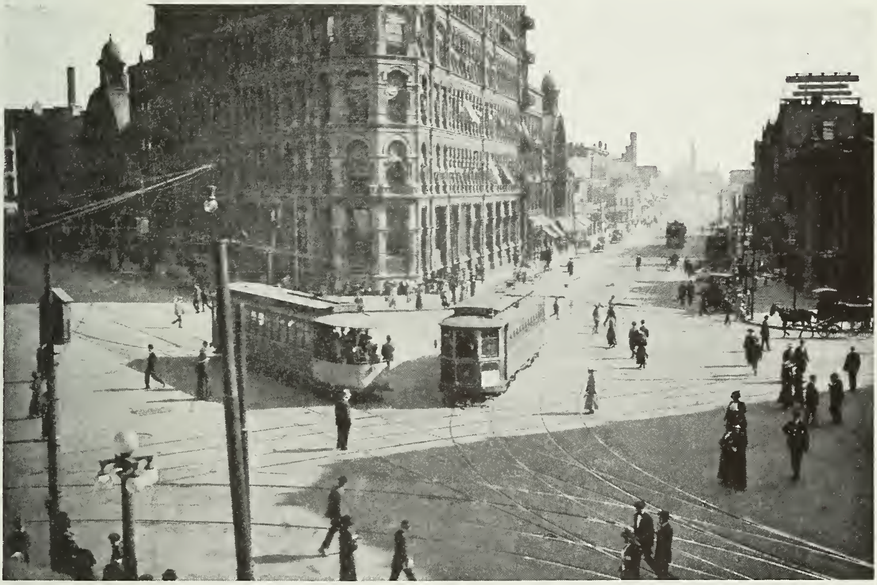
It has large foundries and machine shops, flour and grist mills, steam railway car building and repair shops, structural iron works, printing and publishing plants, planing and wood mills, lumber yards, carriage and wagon works, cotton and woolen goods, starch, furniture, canned goods factories, and many others which belong in the class of its chief industries.

Indianapolis is served by eight trunk steam railway lines, all of which enter the Union Station, and more than 150 trains, carrying over 30,000 passengers, enter and leave daily. The station and lines are outside of the business district. The city is the greatest interurban electric railway center in the world, having no less than 12 lines radiating in all directions, aggregating a trackage of 1346 miles and averaging, in 1911, 517 passenger cars leaving the interurban terminal station every 24 hours, and 65 freight cars from the freight terminal.



Indianapolis Traffic Conditions and Cars. Washington Street at the intersection of Illinois Street and junction of Kentucky Avenue, the southwest corner of the central loop terminal system and the busiest traffic point on the lines

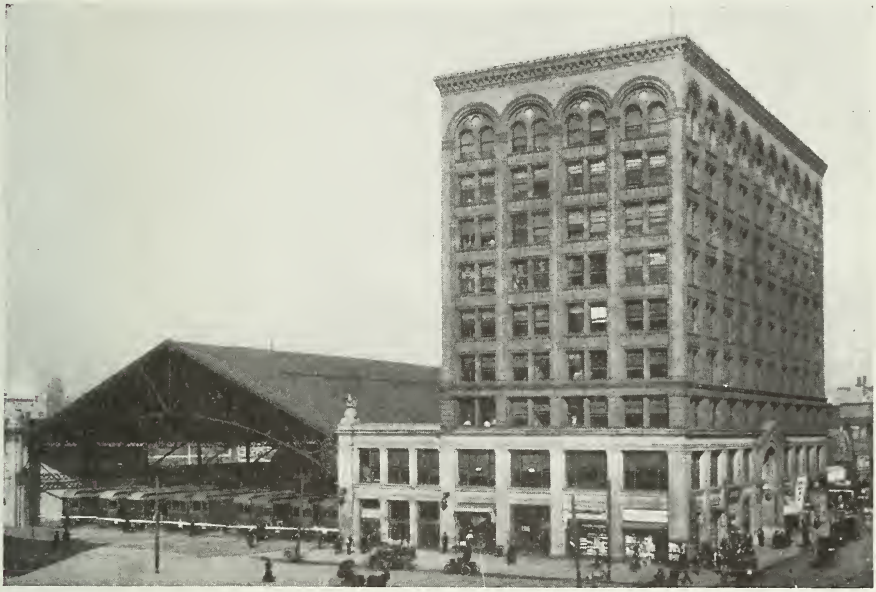
The Indianapolis Traction & Terminal Company operates all of the city lines, comprising 140 miles of single track with nearly all the systems double-tracked. The central loop or belt system of double-track lines, which surrounds a square of four full blocks in the heart of the city, and double-track lines looping around blocks on all sides of the central belt, provide ideal terminal facilities for a radial street railway system of this character and also for the entrance to the terminal station of the interurban cars coming from all directions. The width of the streets, together with the fact that the "Circle" and the thoroughfares within the central loop are free of railway lines, facilitates the movement in every direction of vehicles and pedestrians through this district and reduces to a minimum the traffic congestion commonly experienced in the business districts of large cities.



INDIANAPOLIS TRAFFIC CONDITIONS AND CARS. Looking out Virginia Avenue from the intersection of Washington and Pennsylvania Streets, the southeast corner of the central loop system

The large central belt terminal, by enabling passengers from all parts of the city and vicinity to enter or leave the city and interurban cars at almost any point in this zone, has tended to distribute the office buildings, shops, banks, hotels, theaters and public buildings over a broad area. Washington Street, being the widest thoroughfare and crossing the city at the south side of the central belt, where the traffic from the most populous section enters, has developed somewhat in advance of the others. Illinois Street, at the west side of the belt, has also important advantages, as on it are located the Terminal Building, with its nine-track train shed at the rear and its large waiting rooms and extensive offices, the principal hotel and many of the larger shops, and also because it is chiefly used as the approach to the State Capitol and the Federal building from the Union Station and from other parts of the city. The intersection of Washington and Illinois Streets and the junction of Kentucky Avenue, shown in the photograph on page 326, form the heaviest street railway point in Indianapolis. Between 5.30 and 6 P. M., when the peak of the evening rush hour occurs, an average of six cars a minute, or 360 an hour, pass or turn here. While this number is high

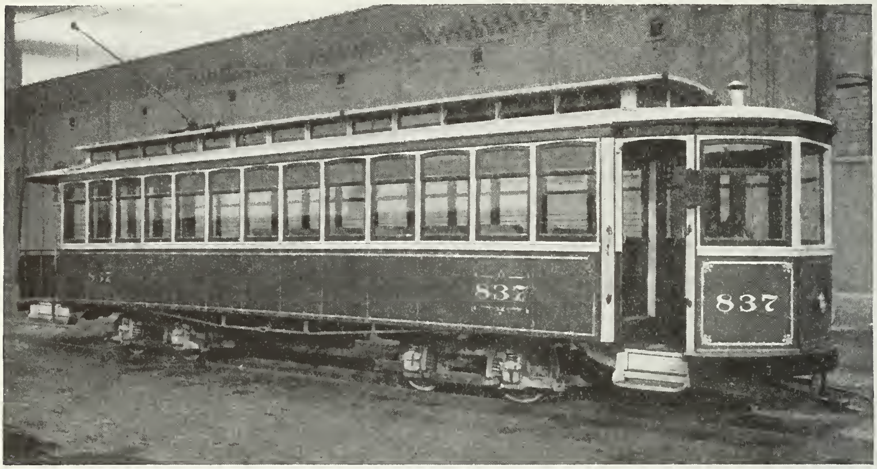
INDIANAPOLIS TRAFFIC CONDITIONS AND CARS. Looking out Massachusetts Avenue from the intersection of Illinois and Ohio Streets, the northeast corner of the central loop system. More interurban cars pass here than at any other point on the city lines



INDIANAPOLIS TRAFFIC CONDITIONS AND CARS. The Terminal Building and nine-track interurban train station (also shown on front cover). Twelve interurban lines operate from the station over the city tracks, out the four radiating avenues and east and west on Washington Street. Waiting rooms on ground floor, and offices of Indianapolis Traction & Terminal Company occupy the top floors

for a system of the completely radial type and for a city of this population, it does not indicate undue congestion, as the cars receive most of their load at various points on the main loop or the supplementary loops and, therefore, the number of passengers taken on at this point or near-by points is not excessive. It shows that a large number of cars can be brought together in the ample trackage of the central loop and supplementary loops whenever needed. As the same character of street intersection and avenue junction is at the three other corners of the central belt system, the conditions are the same except that less cars are needed to handle the traffic in these directions. The wide, level streets and avenues, and long blocks, permit of a comparatively high rate of speed to be attained as soon as the cars leave the central loop district.

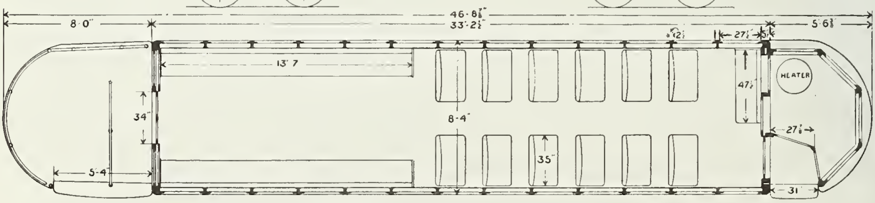
The map on page 323 clearly shows the excellent arrangement of the entire railway system. The routes in all direc-



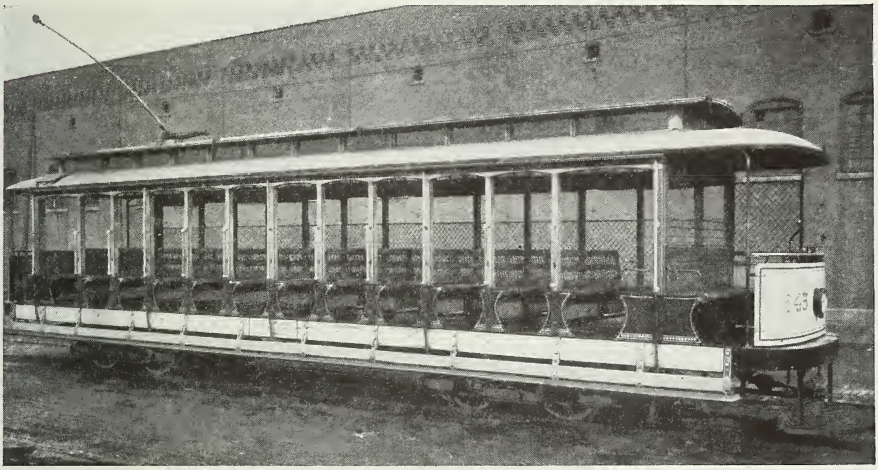
INDIANAPOLIS TRAFFIC CONDITIONS AND CARS. Single-end closed car, the standard type of the system. Mounted on Brill No. 27-F trucks

tions are direct and sufficiently close in the outlying districts to provide adequate transportation to every section within the municipal boundaries and beyond to several parks, the State Fair Grounds, and a number of populous suburbs.

The number of cars in normal operation averages about 244 during the morning rush hour period and 245 for the evening load. These periods extend from 6 to 8.30 a.m., with the peak from 7.30 to 8; and in the evening from 4.30 to 6.30,



INDIANAPOLIS TRAFFIC CONDITIONS AND CARS. Side elevation and floor plan of above car. Seating capacity, 47



Indianapolis Traffic Conditions and Cars. Single-end 15-bench open car, largely used in summer service. Mounted on Brill No. 27-F trucks

with the peak from 5.30 to 6. The car mileage for 1911 totaled 10,540,596, with 65,504,929 revenue passengers carried, which figures 6.21 revenue passengers per car mile; 20,810,437 transfers were collected. The density of traffic in the same year, as shown by the number of revenue passengers per mile of track (140 miles), was 467,892.

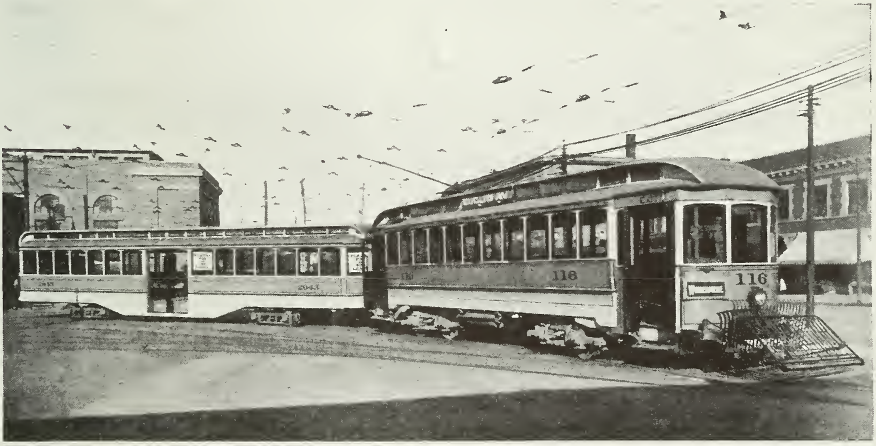
The type of closed car chiefly used on the Indianapolis system is arranged for single-end operation and is built on a staunch wooden bottom frame having sills well reinforced with steel plate and inside and undertrussing to withstand any tendency to deflection due to the wide truck centers and long rear platform. The sides are sheathed with No. 10 sheet steel put on in short sections and readily removable in case of injury. The seating arrangement, shown in the accompanying diagram, provides efficiently for the mixed city and suburban service characteristic of all the lines. Standing space at the rear is supplemented by the long platform on which passengers are allowed to smoke. A wire screen encloses the upper part of the far side of the platform. Ingress and egress are at both ends, the rear step being wide enough for three persons to board or alight at the same time. A railing extends two-thirds the width of the platform from the step; besides serving as a grab handle at the step and a hand-rail on the platform, it enables the conductor to keep the passageway between the door and the step unobstructed. A sliding door in the forward bulkhead opens on a small vestibule which is separated from the motorman's compartment by a short partition having a hinged door. There is no door at the step opening. The cars are heated by a water system with the heater in the motorman's compartment. Brill No. 27-F trucks, capable of a speed of 35 miles per hour, are employed under the majority of these cars.

A large portion of the closed cars are replaced during the summer by 15-bench open cars equipped for single-end control and, therefore, have a running board on one side only and high wire screens enclosing the far side from end to end. The passenger equipment comprises in all 211 double-truck closed cars, 60 single-truck closed, 65 double-truck open, 122 single-truck open. The service cars include 7 sweepers, 2 snow plows, and 6 sand cars equipped with track scrapers.

ONE HUNDRED TRAILER CARS FOR CLEVELAND

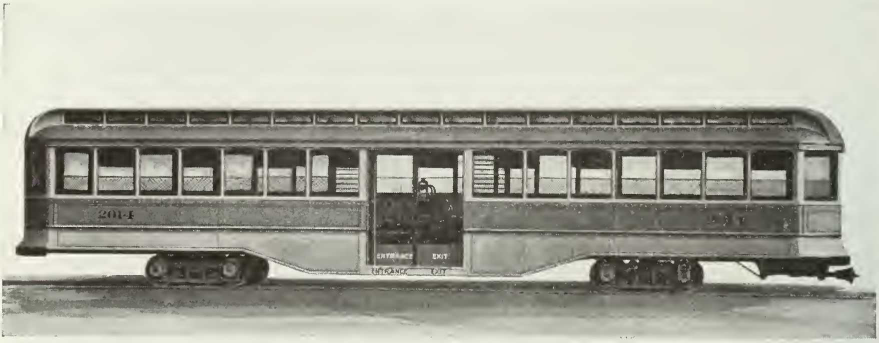
STEEL UNDERFRAME

THE G. C. Kuhlman Car Company is delivering 100 trailer cars, for single-end operation, to the Cleveland Railways Company that are the result of an unusually careful analysis of the local street railway situation. It was long a question as to whether additional motor cars, or the introduction of trailers would best fulfill the requirements of the Cleveland traffic situation. After many conferences, in which the questions were debated by both the railway management and the City Council, the decision finally favored the trailer car installation. The cars are arranged for a large seating capacity and are built as light as prudence permits. A signal system, between the conductor of the trailer and the crew of the motor car, was devised which insures safety to passengers and despatch in operation, for it is apparent that trailer operation, if not carefully planned, may result in embarrassing delays and operating errors. Operation in Cleveland is complex, for the reason that all main line cars have to run either through or to the central loop system in Monument Square, at the center of the city. The consequent congestion at that point during the hours of peak load has grown to an extent that some system must be developed affording both immediate relief and greater capacity for future demands, and it remains to be seen if trailers can be successfully added and operated through the loops. A combined system of pay-as-you-enter and pay-as-you-leave is used in the trailer, in conjunction with a single center door, one-half of the car being operated on the former and the other on the latter basis, the fare-box being the division between the two. The half-door marked "entrance" in the accompanying illustration, is used



TRAILER CARS FOR CLEVELAND. An electric signal system between the cars insures quick and safe movement by all passengers, those remaining on that end paying when they leave, and those going into the other end having to pay when they pass the conductor. At times of greatest congestion this system apparently facilitates loading, as observations have shown that during the evening rush hour period the approximate ingress is 94 per cent, while egress approximates six per cent. This shows the influx to be such as to make it almost impossible for the conductor to collect fares from all entering passengers at heavy traffic stops.

In the all-steel bottom frame, the right side sill is built up of one continuous angle of 12 by 4 by ½-in. steel plate from corner post to corner post, with a vertical drop of 15 in. An additional sill of 4 by 3½ by 5/16-in. angle is riveted to the continuous sill at the fifth side post from each end, where, although remaining in the same horizontal plane with the high continuous sill, it turns inwardly at an angle of 30 degrees until it reaches the sixth side post from either end. Between these two points it lies parallel to the continuous sill, but 13 in. nearer the center line of the car and 15 in. above the low level of the sill, forming the floor level of the second step in the 6 ft. 10 in. door opening. The left side sill is of the usual steel plate, with steel angles riveted the entire length of its top and bottom. The door mechanism on the

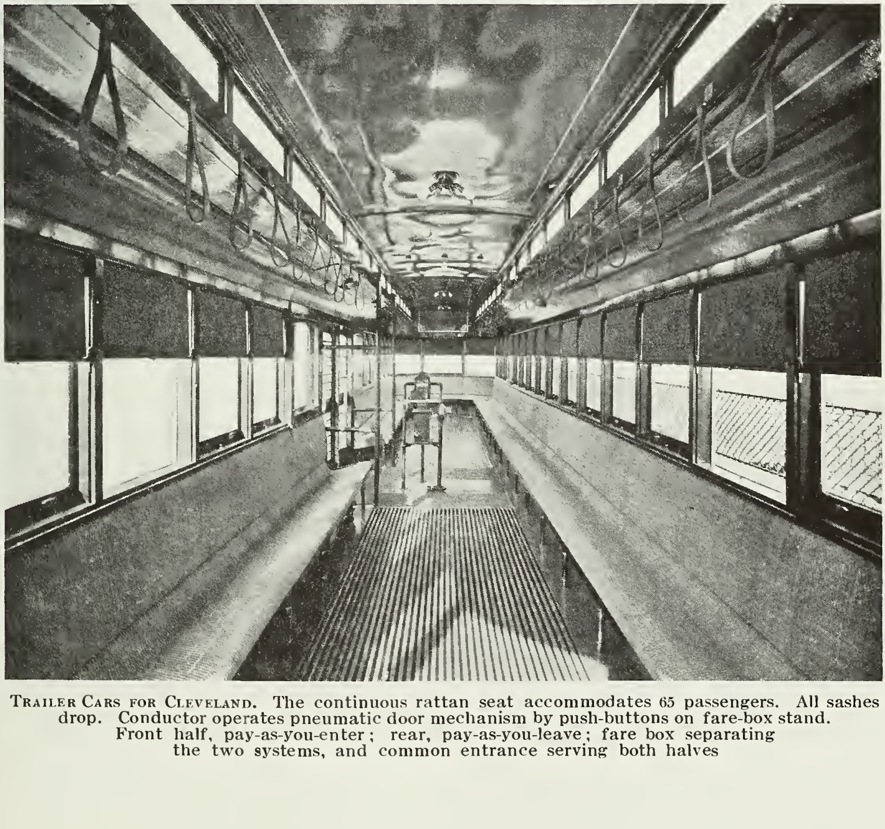


TRAILER CARS FOR CLEVELAND. Side sill on right side drops 15 in. for interior step to floor. Steel sheathing is projected by a steel guard rail. Mounted on specially designed Brill No. 67-F trucks with cast steel side frames and 22-in. wheels right side is pneumatically operated by the conductor by means of push-buttons, which allow the operation of a single door, or the opening or closing of both doors in unison, together with interdependent starting and stopping signal system. An emergency hand brake is placed at the conductor's position.

The cars are mounted on trailer trucks of the Brill No. 67-F type, specially designed for this service. Each side frame is cast in a single piece, including pedestal tie-bar and bolster columns. No end frames are used, and the truck with its 22-in. wheels and 4 ft. 4-in. wheel base is unusually compact.

Length over corner posts	42 ft. 8⅝ in.
Length over vestibules	49 ft. 0 in.
Centers of side posts	2 ft. 5⅞ in.
Width over sides	8 ft. 2 in.
Extreme width	8 ft. 4½ in.
From track to side sills	2 ft. 1⅛ in.
From side sills to top of roof	8 ft. $0\frac{1}{16}$ in.

Type of trucks	Brill No 67-F
Wheel base	4 ft. 4 in.
Diameter of wheels	22 in.
Weight of carbody less electrical equipment	18,640 lb.
Weight of heater equipment	300 lb.
Weight of pair of trucks	7,400 lb.

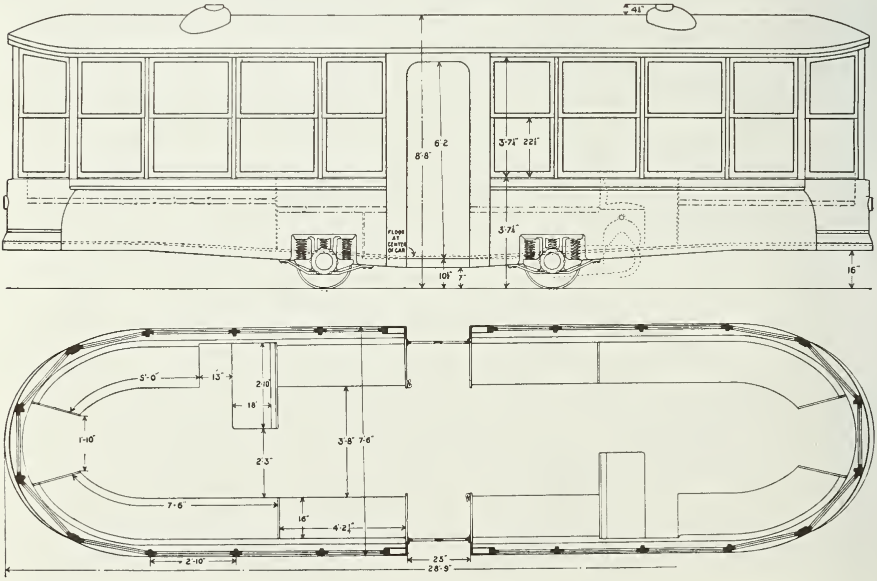


Trailer Cars for Cleveland. The continuous rattan seat accommodates 65 passengers. All sashes drop. Conductor operates pneumatic door mechanism by push-buttons on fare-box stand. Front half, pay-as-you-enter; rear, pay-as-you-leave; fare box separating the two systems, and common entrance serving both halves

STEPLESS STORAGE BATTERY CAR FOR NEW YORK RAILWAYS COMPANY

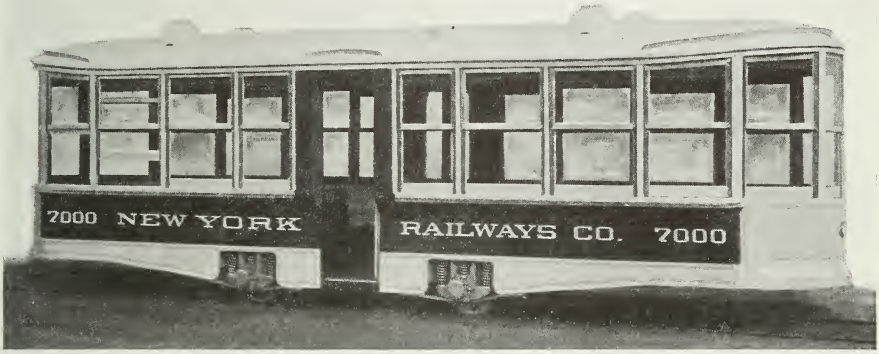
AS the result of an endeavor to at once improve its service efficiency on crosstown lines and reduce operation to the greatest degree of economy, the New York Railways Company has had built, by The J. G. Brill Company, an experimental semi-steel stepless storage battery car, for double-end operation, based on the Hedley-Doyle designs of its prototype, the New York "Stepless" car, which was described in the March, 1912, issue of BRILL MAGAZINE.

The new car is decidedly novel in its general appointments, and particularly as regards the entire framing and the method of propulsion. The weight reduction that has been obtained, consistent with the strength required for the heavy service into which the car will be drafted, is evident in the total

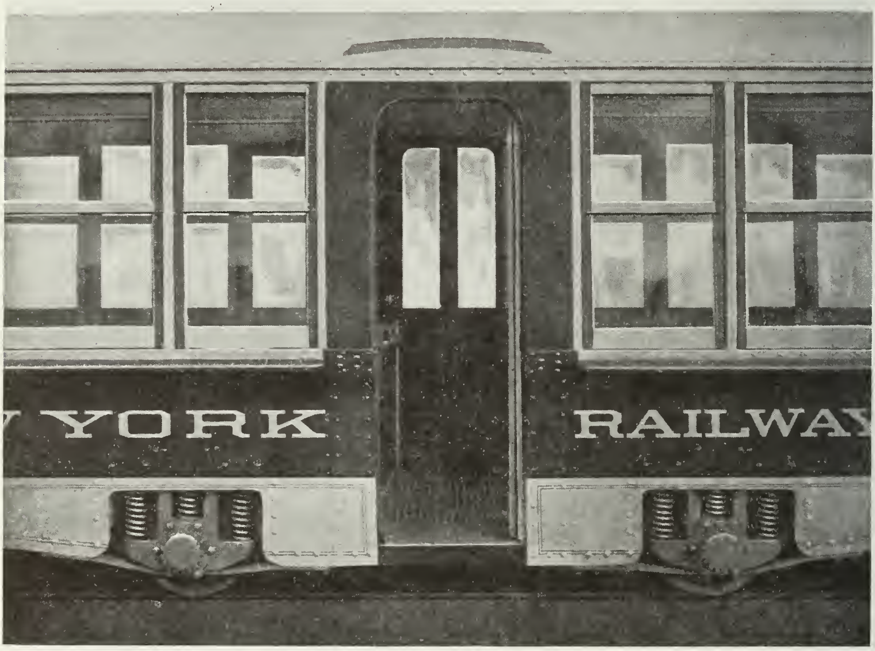


STEPLESS STORAGE BATTERY CAR. Absence of platforms, and motorman being in body, economize space. Longitudinal seats increase the aisle space. Seats 34 passengers and allows standing room for 28 weight of body and running gear of but 9600 pounds, less electrical equipment, or a weight of only 282.35 pounds per seated passenger on the basis of seats for 34 persons.

The stepless feature, which enables the sill tread at the central doors on both sides of the car to be only 10½ in. above the track, is obtained by gradually sloping the floor downward toward the center from both car ends. The sloping floor sections do not meet, but between them is a floor section that is level at the doors, and but one inch higher at the lengthwise center line of the car, the purpose of this being to allow the center stringers to clear the axles. Due to the fact that this form of construction is impossible with a separate truck for the wheels, the underframe is ingeniously designed to serve as a truck frame as well. The low level of the car necessitates the wheels projecting through the floor, and while ordinarily this feature would be objectionable, it is overcome by placing a seat directly over the opening. The combined bottom frame and truck actually consists of five distinct sections, or two on each car end, and a single central section that serves as a floor support between the door openings. The end sections

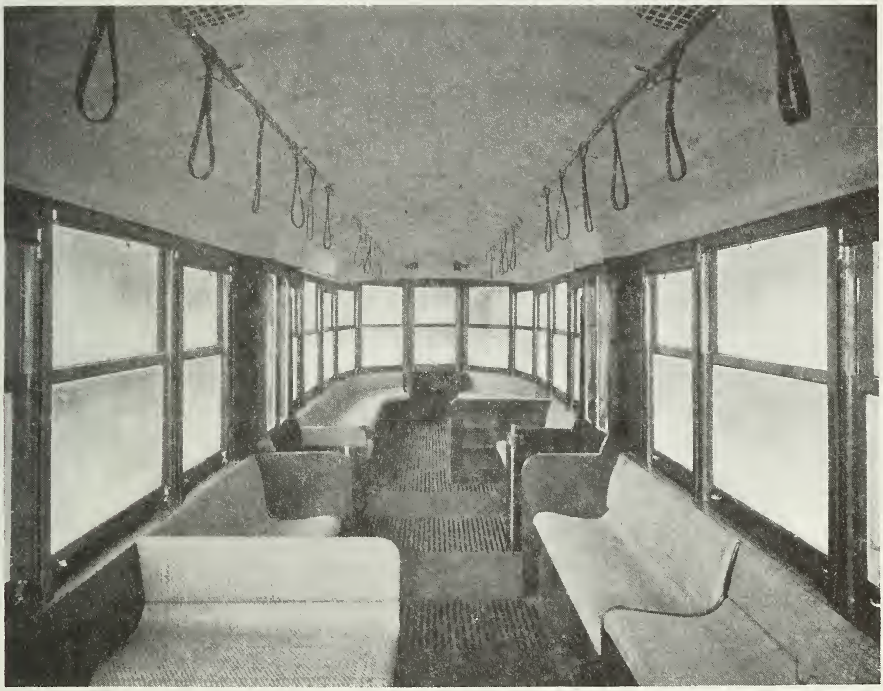


STEPLESS STORAGE BATTERY CAR. The floor slopes gradually upward from the door opening. Journal box pedestals connect the two adjacent side sill members, making the steel underframe serve also as truck frame. Designed to replace horse cars on important crosstown lines of the interrupted side sills are made up of one 3½- by 3½- by 5/16-in. continuous angle, the rounded portion of which serves as the car bumper. The ends of this angle, on each side of the car, are riveted to a malleable iron pedestal bracket, which is both a continuation of the side sill and a pedestal for the journal boxes. The end of this bracket, nearer the center of the car, is riveted to another 3½- by 3½- by 5/16-in. angle that forms the central portion under the door opening. Due to the wheels protruding into the car interior, and also because of the placing of the motors under seats directly ahead of each right hand wheel, looking toward either car end, the arrangement of stringers and crossings is necessarily somewhat complex.

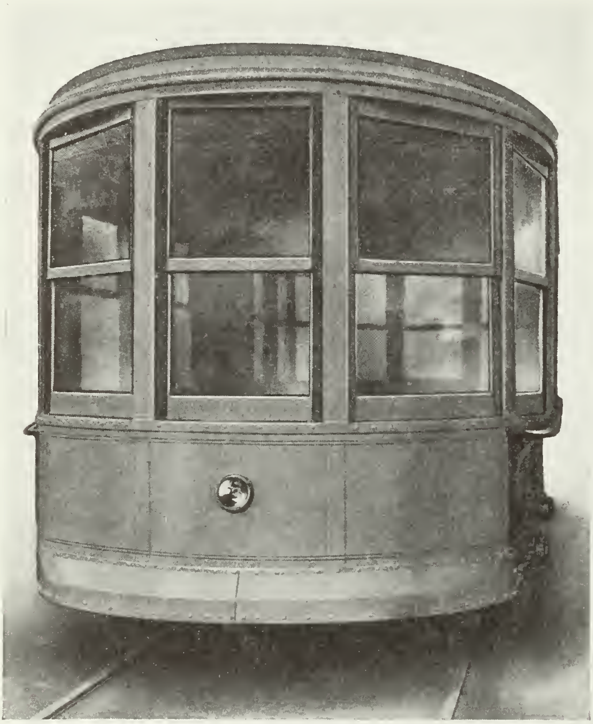


STEPLESS STORAGE BATTERY CAR. The two-panel folding door is operated by the conductor from the staff on opposite side. The 25-in. opening is framed in a single pressed steel "U". Floor at doors is only 10½ in. over the rail

To obtain a large factor of safety, in spite of interruption to continuous longitudinal bracing occasioned by the central 25-in. door opening, the door frame is a one-piece, inverted, pressed-steel "U", the inwardly turned flanging of which serves both as round corner for the opening and as a means of stiffening the frame vertically and longitudinally. The frame is further supported in that an inside and outside convex belt rail is riveted to each vertical portion, which continues toward the car end, securely fastened to the three ash side posts and the ash corner post in each end. The belt rails are attached at the top of the $5\,{}^{7}/_{16}$-in. offset in the side posts, which is discernible in the photograph. A ${}^{3}/_{16}$-in. steel sheathing covers the entire car side below the belt rails, and while it adds to the finished appearance of the car, it also



STEPLESS STORAGE BATTERY CAR. Longitudinal seats on both sides are interrupted by two cross seats at diagonally opposite points to cover the motors. Twenty-two Hycap-Exide storage batteries are under seats in each half, as well as wheels and brake rigging. Motorman's space enclosed by roller curtains. Roof of $\frac{3}{16}$-in. composition board to reduce weight. Lower sashes have brass stiles and are made to raise



STEPLESS STORAGE BATTERY CAR. The side sills are continued around the ends, forming the bumpers. The generally low level of the floor determined the novel side produced by the sweep of the posts

takes a proportion of the strain imposed on the underframe and belt rails.

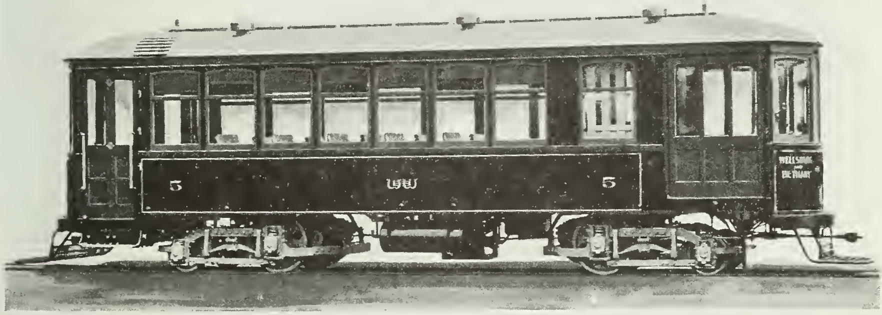
The cushions are all arranged to be lifted from their supports to afford access to the Hycap-Exide storage batteries, the motors and the brake rigging over the wheels. The battery cells are in duplicate groups in each half of the car, there being 12 cells under the forward longitudinal and two under the seat near the door, on the left side; six are under the forward longitudinal and two under the seat near the door on the right side, or 44 cells in the entire car. The doors are two panel, folding inwardly, and actuated by handles controlled by the conductor, and when open are flush with the side of the door frame. The motors are connected with a spur gear that is integral with an external sprocket, from which the wheels are driven by chains.

Length over all	28 ft. 9 in.	From floor to center of headlining	7 ft. $8\frac{5}{16}$ in.
Centers of side posts	2 ft. 10 in.		
Width over sills	6 ft. 7 in.	Wheel base	7 ft. 6 in.
Width over posts	7 ft. 6 in.	Diameter of wheels	21 in.
Extreme width	7 ft. 9¼ in.	Size of journals	3¼ by $8\frac{15}{16}$ in.
From side sills over roof	8 ft. 1 in.	Weight of carbody, less electrical equipment	9,600 lb.
Seating capacity	32		

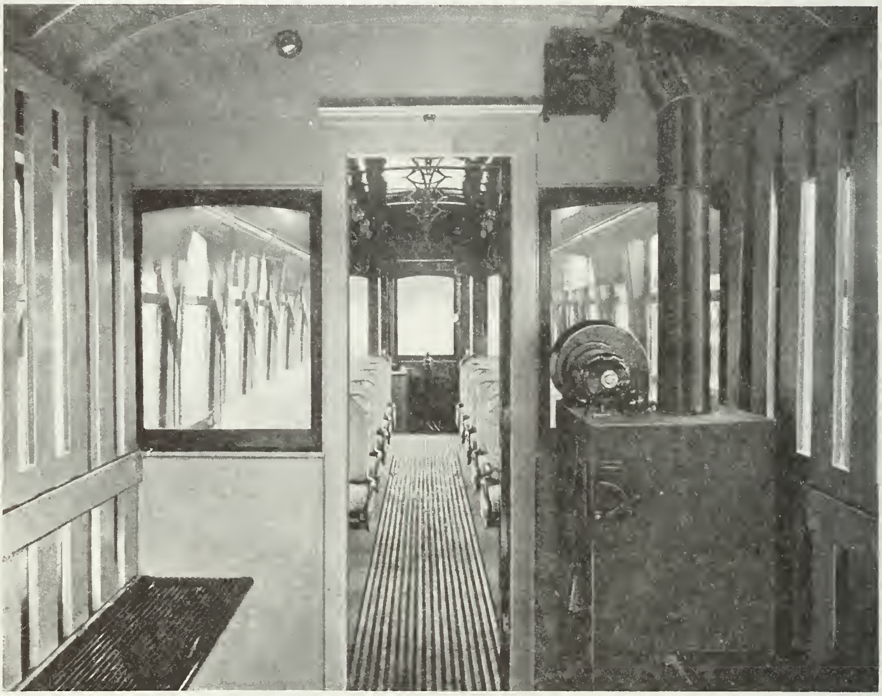
PASSENGER CAR WITH BAGGAGE COMPARTMENT FOR WELLSBURG, W. VA.

BRILL SINGLE-MOTOR TRUCKS

AN interesting car with baggage compartment, for double-end operation in light interurban service, was recently delivered to the Wellsburg, Bethany & Washington Traction Company, Wellsburg, W. Va., by the G. C. Kuhlman Car Company. The car is built on a wooden bottom frame, mounted on Brill No. 39-E single-motor trucks, the use of which permits a lower step elevation, because of the small leading wheel affording greater clearance to the platform knees than full-sized wheels and because the drivers turn on a shorter radius, allowing them to come between the sills. The bottom frame is made up of long-leaf yellow pine side sills and stringers and white oak crossings, in addition to which there are two steel truss crossings, each 15⅛ in. from the lateral center line of the car, which accommodate the supports for the brake cylinder and air tank. The method of fastening these trusses to the sill, by means of unusually large steel gusset plates, stiffens them sufficiently to withstand the thrust



Passenger and Baggage Car for Wellsburg. W. Va. The first car of this kind to be mounted on Brill No. 39-E trucks. Brill semi-convertible window system of the brake cylinder piston. The use of two continuous wood central stringers from crown piece to crown piece and the further use of two 3 by 4 by ½-in angles as platform supports, which are additionally assisted by channel-shaped platform knees, provides the proper longitudinal and diagonal bracing.



PASSENGER AND BAGGAGE CAR FOR WELLSBURG, W. VA. Heater in baggage compartment is removable, and a seat behind it folds down. Brill "Winner" seats in passenger and folding seats in baggage compartments seat 34 persons

The interior is divided into a passenger and a baggage compartment, with large window space and abundance of air in summer, provided by the Brill semi-convertible window system, in which the sashes disappear in roof pockets. Transverse seats of the Brill "Winner" type, one longitudinal seat on each side of this compartment, an additional cross seat against the partition, and six additional in baggage compartments, give a seating capacity for 28 persons.

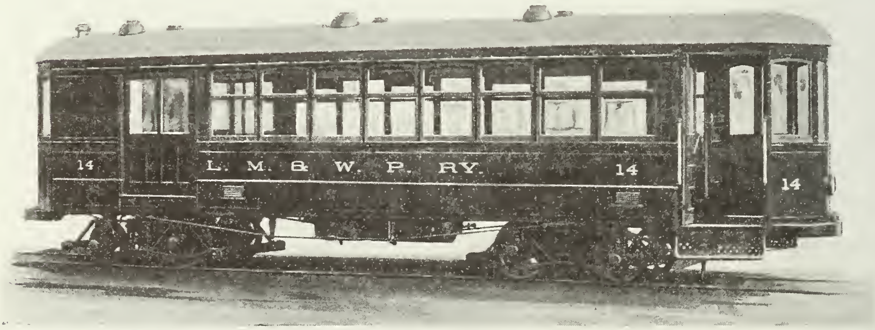
Length of body	30 ft. 3½ in.
Length over vestibule sheathing	35 ft. 0 in.
Length of platform	4 ft. 8½ in.
Length of baggage compartment	12 ft. 1 in.
Centers of side posts	2 ft. 8 in.
Width over sills	7 ft. 11½ in.
Width over posts at belt	8 ft. 1 in.
Extreme width	8 ft. 3½ in.
From track to sills	2 ft. 8 in.
From side sills over trolley boards	8 ft. 9$\frac{1}{16}$ in.
From floor to headlining	7 ft. 7⅛ in.
From track to step	15⅜ in.
Step to platform	14½ in.
Platform to floor	9 in.
Seating capacity	34
Type of trucks	Brill No. 39-E
Wheel base	4 ft. 6 in.
Diameter of wheels	33 and 21 in.
Wt. of body less electrical equipment	18,600 lb.
Wt. of trucks	10,020 lb.
Wt. of motors, including electrical equipment	6,220 lb.

DOUBLE-TRUCK STORAGE BATTERY TYPE FOR LEWISBURG, MILTON & WATSONTOWN PASSENGER RAILWAY CO.

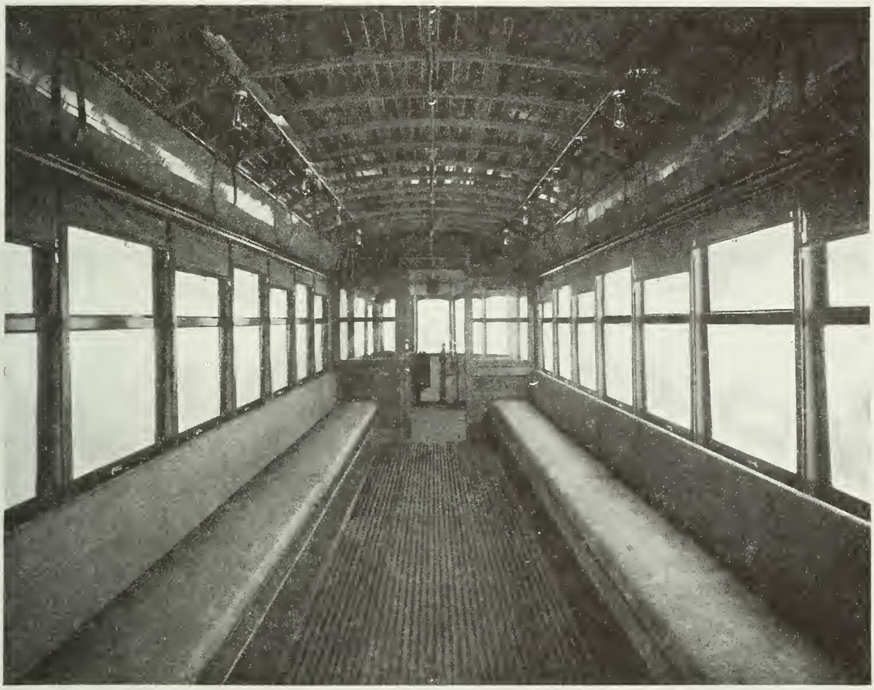
SINGLE-MOTOR TRUCKS

A DOUBLE-TRUCK combination passenger and baggage car for storage battery operation was recently furnished to the Lewisburg, Milton & Watsontown Passenger Railway Company, of Milton, Pa., by The J. G. Brill Company, in complete operating condition. During the few weeks since the car has been in operation it is reported to have given excellent service on the 11-mile line between Montandon, on the Philadelphia & Erie Division, and Mifflinsburg, on the Lewisburg & Tyrone Division of the Pennsylvania Railroad, which is leased by the purchasers of the car. The line serves a thickly-populated rural district where speed is not as essential as regularity, although 25 miles per hour is developed, and with the very frequent stops it is able to keep to the running time formerly maintained by a steam passenger train. The schedule calls for five daily trips per car, and it is expected soon to extend the operation of the car to Gleniron, 10 miles further.

While the utmost care was exercised, in designing this car, to eliminate any unnecessary weight, the construction throughout is of standard character adapted in a very simple manner to take care of the weight of the battery, which is largely imposed on the bottom framing between the truck centers. In the construction of the bottom frame, steel of commercial shapes is principally employed, the only wooden members being light side and end sills, into which the posts are tenoned, and cross members for attaching the flooring. The side sills are formed of 9 by ¼-in. plate with a fairly heavy angle at the bottom with flange extending outwardly, on which the light wooden sill rests; the top of the plate has a light angle on the inside. In addition to the side posts being tenoned into the wooden sill and strap-bolted through the angle, they are securely screwed to the plate. An undertruss, anchored at the bolsters, reinforces the construction, and the rear end has a high inside truss which extends from near the center of the car to a point close to the end sill to prevent any tendency toward deflection caused by the load on the rear platform. At the front end of the frame a channel is brought around in one piece, and, together with

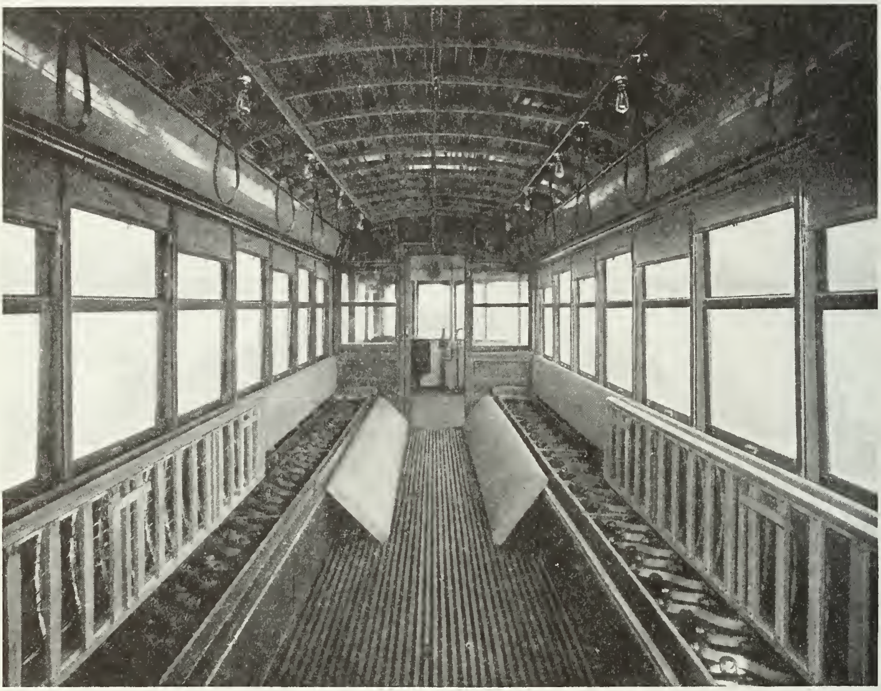


STORAGE BATTERY CAR FOR LEWISBURG, PA. Car has total weight of 32,200 lb. Runs between Montandon and Mifflinsburg, Pa., 11 miles, over tracks leased from Pennsylvania R. R., maintaining schedule of former steam trains



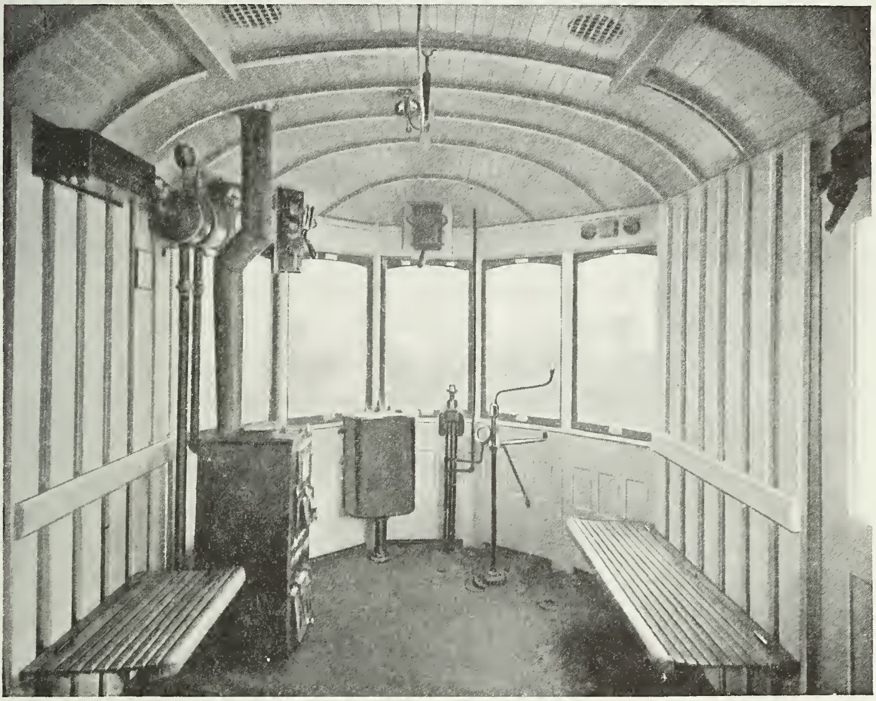
Storage Battery Car for Lewisburg, Pa. Aisle is 3¼ in. higher than floor under seats to allow for extra battery height. Lower sashes raise full height. Seating capacity of this compartment, 32

a stout angle bumper of slightly parabolic form having angle connections to the channel, provides ample support for the load imposed at this part, and capable of resisting ordinary shocks which the bumper may receive. Two channels, crossing the middle of the frame, with centers four feet apart, are gusseted to the under part of the sill angles and serve as needle beams as well as supporting members for the air-brake tank, cylinder and compressor. Two flat-bar diagonal braces, each 15 ft. long, are riveted to the sill plates and to channel crossings by means of corner brackets. To these channel crossings are brought two channel stringers which, besides bracing the crossings at the center, support the body brake lever. The motor trap tees are supported on the channel crossings and angle crossings placed close to the bolsters. A deep channel end sill is connected to the side sills with corner brackets of generous dimensions; diagonal braces are brought from the side sills close to the bolster to the end sill and secured with angle brackets. Channel steel truss knees of the standard Brill type support the platform, and two centrally placed channels extend from the end sill to the angle bumper. Open plate bolsters of the builder's standard type are employed. As it is desirable to use high cells for the battery, calling for 3¼ in. additional vertical space under the longitudinal seats than is obtained in ordinary trolley car construction, the bottom frame was designed to have all members 3¼ in. lower than the side and end sills, enabling the floor under the seats to be depressed that amount. No battery cells being placed in the baggage compartment, the floor is 3¼ in. lower than the passenger compartment, causing

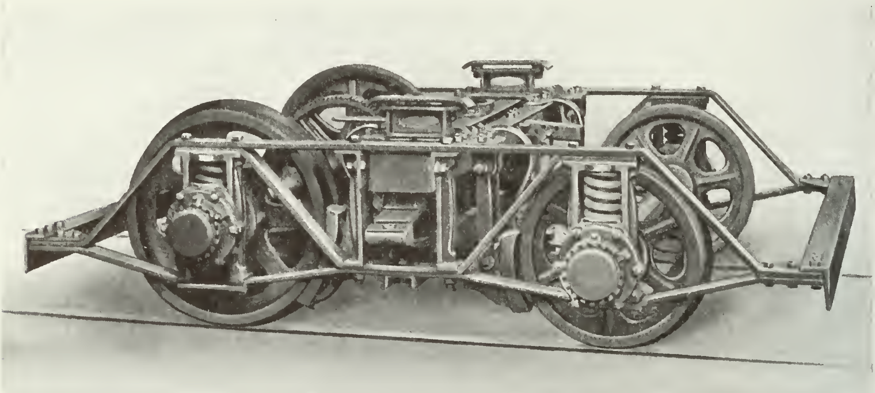


STORAGE BATTERY CAR FOR LEWISBURG, PA. Under each longitudinal seat there are 44 Hycap-Exide storage battery cells, placed in 22 cases of two cells each. Battery spaces ventilated through slatted openings in the car sides a slight rise over the side sill at the side doors of the baggage compartment. The battery, which is of the Hycap-Exide type, is made up of 88 cells, two cells to a case and 22 cases to each side. Ventilation for battery compartments is secured through openings in lower side panels, covered with slats.

The interior appearance and appointments of both compartments are shown in the photographs, and therefore need no detailed description other than to state that the upper sashes of the windows are stationary and the lower sashes are arranged to raise their full height; also that the plain arch roof has carline finish, and Brill "Exhaust" ventilators are installed. The car is mounted on trucks of the builder's No. 69-E type, specially designed for a light single- or double-motor equipment, single-motor equipment per truck being



STORAGE BATTERY CAR FOR LEWISBURG, PA. Baggage compartment is 11 ft. 6 in. long and floor is 3¼ in. lower than passenger compartment. Folding seats accommodate 8 passengers. Sashes in end arranged to drop



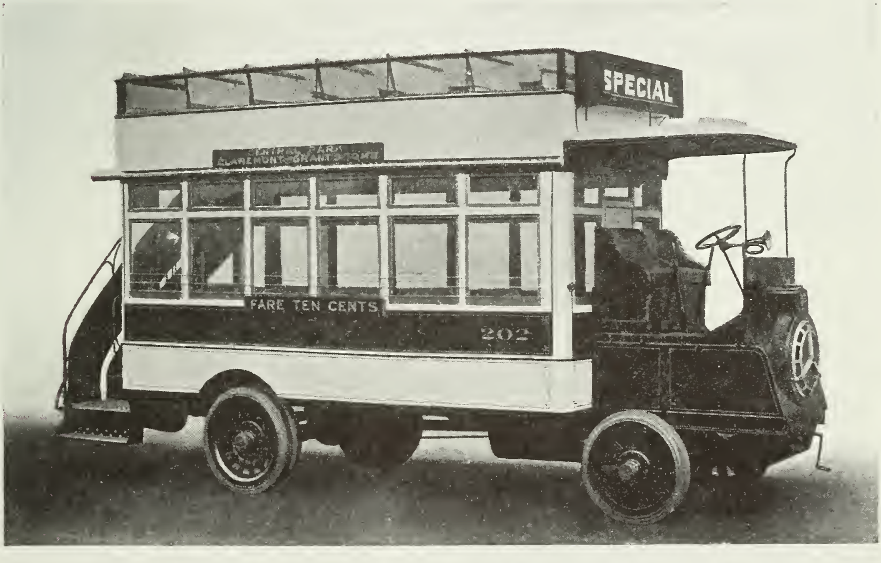
STORAGE BATTERY CAR FOR LEWISBURG, PA. The car is mounted on Brill 69-E diamond arch-bar trucks, arranged for single motors, All journals equal size, and difference in wheel diameters made up by high coil springs over pony wheels. Wheel base 4 ft. 6 in.

used with this car. As shown in the photograph of the truck, the diamond arch-bar frame has low-carried angle end frames joined to the side frames with gusset plates, which helps to preserve squareness, besides furnishing ample support for the outside-hung motors, The angle transoms are powerfully connected to the side frames with wide gusset plates and by being bolted to frame columns. The bolster is of the usual swing type. An interesting feature of the truck, as arranged for this car, is in the method adopted for obtaining clearance under the platform knees by simply using high coil springs over the journals of the trailer wheels, which enables them to be of smaller diameter without changing the design of this end of the truck. The trucks are equipped with Brill Half-Ball brake hangers, and a simple differential lever system equalizes the brake pressure on each pair of wheels.

Length over corner posts	34 ft. 4 in.	Type of trucks	Brill No. 69-E
Length over platform	39 ft. 8 in.	Wheel base	4 ft. 6 in.
Length of platform	5 ft. 4 in.	Diameter of wheels	30 in.
Length of baggage comp.	11 ft. 6 in.	Size of journal	$3\frac{11}{16}$ in.
Length of passenger comp.	22 ft. 6 in.	Type of motors	GE1027-2—4 to 12 hp.
Centers of side posts	2 ft. 8 in.		
Width over sides	8 ft. 2 in.	Weight of carbody less electrical equipment	10,700 lb.
From rail over roof	11 ft. 3 in.	Wt. of electrical equipment	8,800 lb.
Track to step	16½ in.	Wt. of air-brake equipment	1,500 lb.
Step to platform	14½ in.	Weight of trucks	9,000 lb.
Platform to floor	9⅛ in.	Weight of motors	2,200 lb.
Seating capacity	40	Total weight	32,200 lb.

DOUBLE-DECK AUTO-OMNIBUSES FOR FIFTH AVENUE, NEW YORK

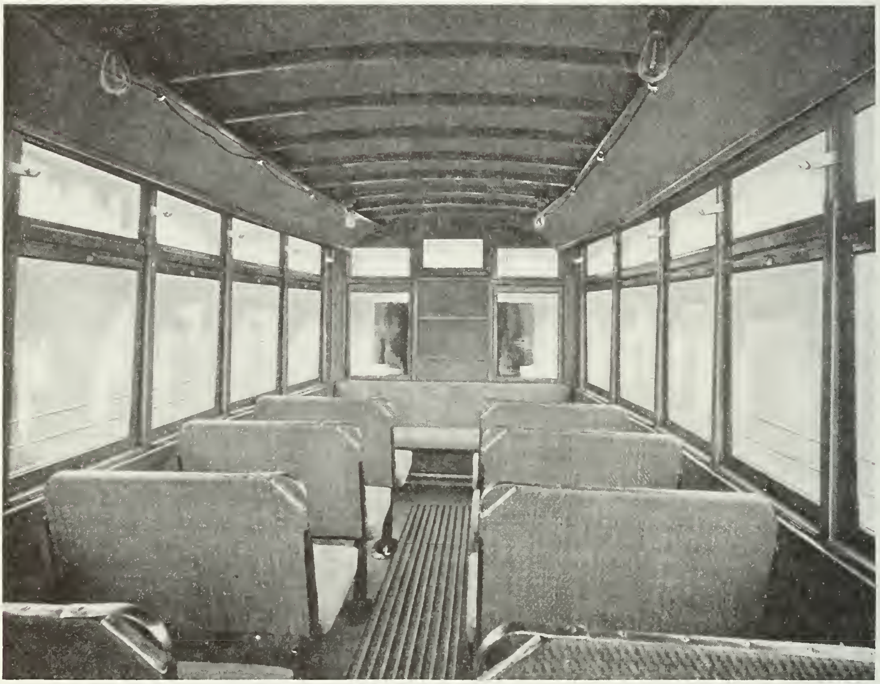
AN order for 25 double-deck bus bodies for the Fifth Avenue Coach Company, New York, was completed recently by The J. G. Brill Company. The order was largely contingent upon the important question of low weight, as being one of the chief factors affecting either the economy or extravagance of automobile operation. It was essential to prepare an unusually sturdy design that would withstand the combined racking of a powerful gasoline motor and rough pavements; that would be easy to maintain in good condition; that would be so balanced as to reduce shocks to a minimum, ride smoothly under exacting conditions and reduce wear on tires as much as possible; that would afford quick ingress and egress of passengers and seat a large num-



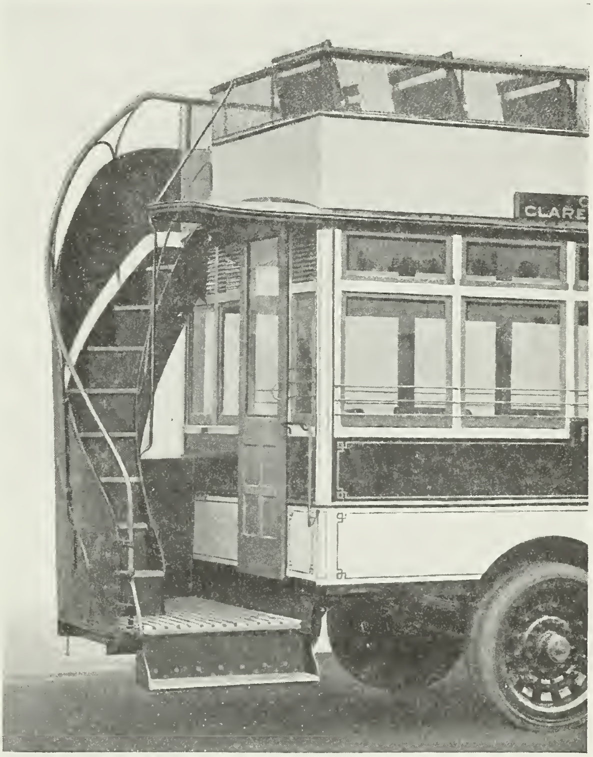
AUTO-OMNIBUSES FOR NEW YORK. These buses operate under severe traffic conditions on streets where cars are not permitted. They are used much by pleasure riders. Bodies complete weigh only 3800 lb.

ber of people without crowding and at the same time bring the weight to the lowest possible point.

The routes operated by the Fifth Avenue Coach Company present a diversity of conditions as regards numerous roadways, traffic density and an almost equal proportion of passengers who ride for either business or pleasure. Certain streets and avenues in New York have never been invaded by the street car and the autobus service of this company, that is the outgrowth of an ancient horse stage service, is filling an urban need of almost vital importance. The character of the service, its regularity and efficiency and the pleasing appointments of the buses, the large majority of which are equipped with Brill-built bodies, have made this means of transit unusually popular.



AUTO-OMNIBUSES FOR NEW YORK. Lower sashes drop and upper swing inwardly from hinges on under side. Seating capacity, 23



Auto-Omnibuses for New York. The platform is supported on channels attached directly to the chassis. The stairway is 16 in. wide. Seating capacity of upper deck, 22

The underframing of the body, which converges slightly toward the front, consists of 2¾ by 2¾-in. ash side sills and 2⅜ by 3-in. end sills of the same, securely braced at their joints by corner irons. Straight side posts are of ash, as are the rear corner posts, but the front corner posts are poplar, because a large post was required for securing a sufficient radius for a large round corner, without unduly increasing the weight. The 5-in. plain arch roof extends over the front and rear, to form canopies over the chauffeur's seat and the platform, and is made up of 3-ply birch veneer, ¼ in. thick, upon which poplar boards are placed. Canvas is drawn over the entire roof structure, and a superfloor is placed upon this for the upper deck. The superfloor consists of tapered mat strips, 1⅞ in. wide, laid transversely between the seats and longitudinally in the aisle. The four sides of the roof are completely surrounded by sheet iron skirting, that reaches as high as the seat level, above which there is a wire mesh guard rail, with poplar-board facing. An opening is provided for the spiral stairway at the left rear corner. Eleven self-draining, stationary, wooden Brill seats, with ash legs and back, are arranged six on the right and five on the left side, seating 22 passengers on the upper deck. In addition to the side windows there are two of the double-sash type in the front and three in the rear bulkhead, arranged to drop. Narrow ⅝-in. yellow pine boards, laid with tapered mat strips, along the 16-in. central aisle, form the flooring upon which are mounted a three-passenger and a one-passenger transverse seat, in the rear left and right corners, respectively, between these being a sliding door, 24½ in. wide, opening to the platform. Ahead of these, on each side, are four Brill rattan-covered transverse seats with stationary backs and pressed steel frames and pedestals, and a further cross seat, backed against the front bulkhead, that extends across the body, giving an interior seating capacity of 23.

The rear platform is supported on steel channel platform knees that are a part of the chassis, thereby relieving the body framing of any strain from this source. The platform level is 11⅛ in. below the body floor level. The spiral stairway, 16 in. wide, is lined on the inside and outside with sheet iron, and further protected by a sheet iron banister, as well as a pipe railing. The railing and banister extend to the platform step on the lower end, and the space on the platform under the stairway and extending across to the rear bulkhead is built in box form, with an exterior hinged door, for the accommodation of a storage battery.

The interior fittings are in natural ash, while push-buttons, a signal bell, electric lights, stationary side signs and a luminous rotative front roof sign are fitted.

Length over corner posts	14 ft. 5 in.	Step to platform	10¾ in.
Length over all	17 ft. 6½ in.	Platform to floor	11⅛ in.
Length of platform	3 ft. 1½ in.	Seating capacity	45
Centers of side posts	2 ft. 3⅛ in.	Type of chassis	de Dion Bouton
Width over sills	7 ft. 2 in.	Wheel base	11 ft. 8⅛ in.
Width over posts	7 ft. 2 in.	Diameter of wheels	34 in. and 36 in.
Extreme width	7 ft. 4 in.	Weight of body and electrical equipment	3,800 lb.
From floor to center of rafters	6 ft. 2⅝ in.	Weight of chassis	7,200 lb.
Street to step	14¾ in.		

THE J. G. BRILL COMPANY

Main Office
PHILADELPHIA, U.S.A.
Cable Address: "BRILL," Philadelphia

LONDON OFFICE: 110 CANNON STREET, E. C.
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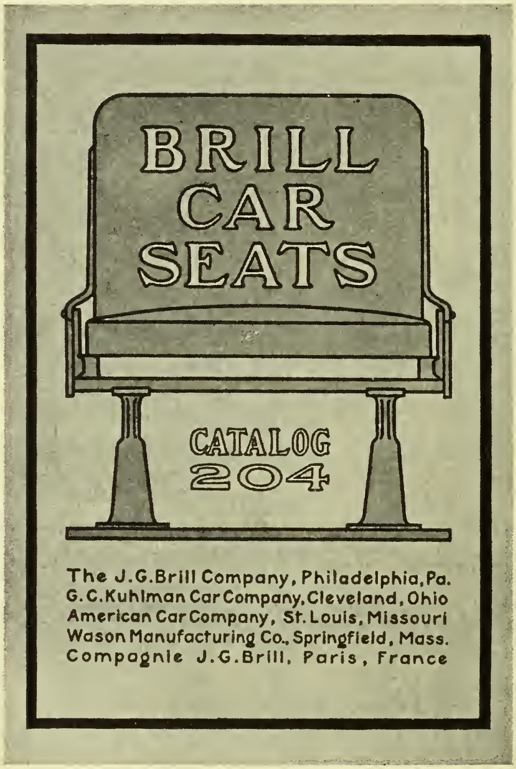
Write the new address on the envelope in which this Magazine is received and return the envelope to the Publicity Department, The J. G. Brill Company



BRILL
CAR
SEATS

CATALOG
204

The J.G.Brill Company, Philadelphia, Pa.
G.C.Kuhlman Car Company, Cleveland, Ohio
American Car Company, St. Louis, Missouri
Wason Manufacturing Co., Springfield, Mass.
Compagnie J.G.Brill, Paris, France

THIS NEW 52-PAGE CATALOG

is being sent to all city and interurban railway companies. It contains engravings and complete descriptions of all styles of "Winner" seats, non-reversible seats, open-car seats, motormen's seats, rattan seating materials, etc. For additional copies, address Publicity Department, The J. G. Brill Company, Philadelphia, Pa.

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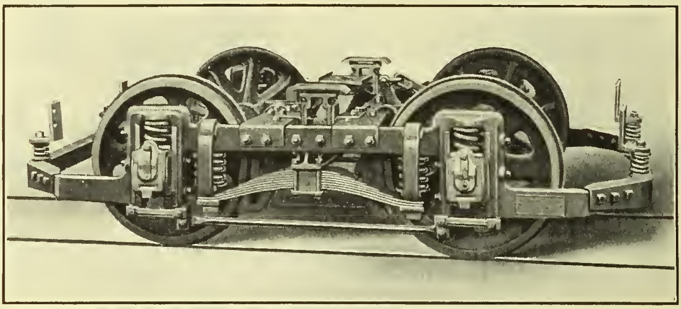
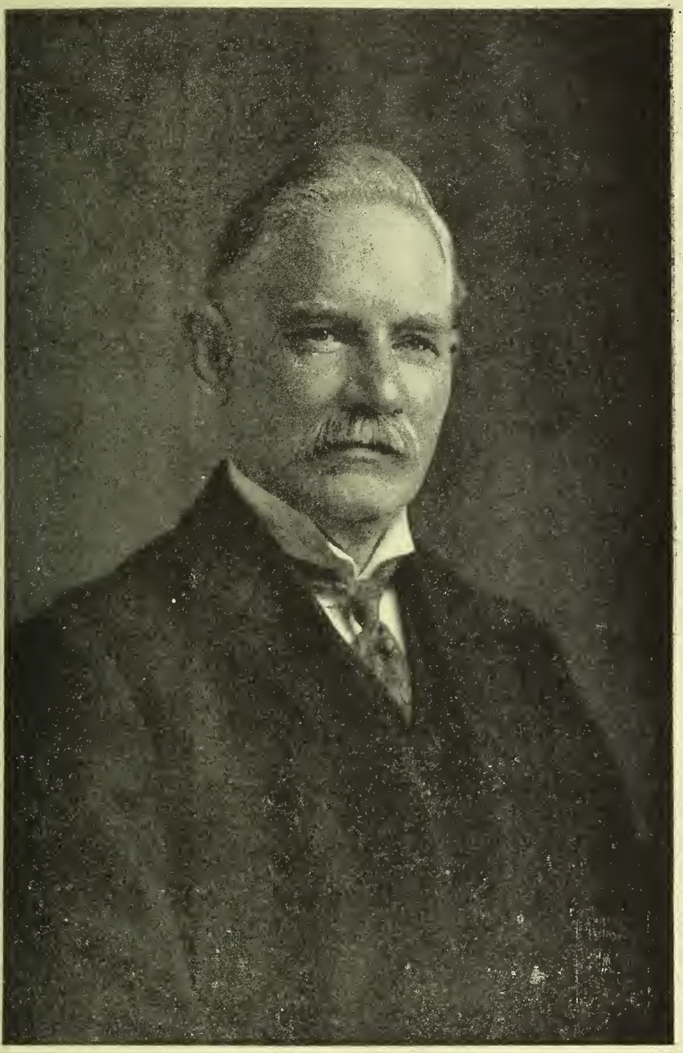


BRILL No. 27-G TRUCK

When a truck, through the 18 years of its existence, has been made the standard of such roads as the United Railways & Electric Company (Baltimore), the Chicago Railways Company, the United Railways of San Francisco, the British Columbia Electric Railway, and a long list of foremost companies at home and abroad, and its sales have been steadily growing throughout that period, it is reasonable to suppose that the truck is sound in principle, design and construction. Three sets of springs cushion every movement, and two of the sets are free from the dampening effect of the heavy motors, enabling these springs to absorb all shocks and vibrations not entirely met by the journal springs, and giving a singularly easy motion to the carbody.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA



J. Aldworth

General Manager, Nottingham Corporation Tramways, England

SUPPLEMENT TO BRILL MAGAZIN
DECEMBER, 1912

BRILL MAGAZINE

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Vol. VI DECEMBER, 1912 No. 12

JOHN ALDWORTH

[WITH PORTRAIT INSERT]

JOHN ALDWORTH, general manager of the Nottingham Corporation Tramways, England, was born in the city of Liverpool, 1855. He finished his education at the "Vale of White House" Collegiate School, Wantage, England, and then served as an apprentice in mechanical engineering. After a connection of many years with Merryweather & Sons, fire and hydraulic engineers of London, Mr. Aldworth entered the tramway field in 1884, and became engineer of the North London Tramways Company. He resigned a few years later when he was appointed engineer and manager of the Coventry Tramways Company. In 1893 he accepted the position of engineer of the Isle of Man Tramways & Electric Power Company, and one year later was promoted to the office of general manager of the system. In 1898 he had the honor of being one of three selected candidates for the appointment of Chief Officer of the London County Council Tramways, and shortly afterwards was appointed to his present position. His activities in the tramway field have been confined to the United Kingdom, and the manner in which he has come to the front speaks well for his abilities in this line. The Nottingham System consists of 20 miles of track, and has in operation at present about 125 double-deck cars. Mr. Aldworth was one of the founders of the Municipal Tramways Association of Great Britain, and served as its president, 1907-8, beside being a member of the Executive Council since its commencement.

CONDITIONS WHICH GOVERN THE TYPE OF CAR FOR CITY SERVICE

VANCOUVER, BRITISH COLUMBIA*

VANCOUVER, the metropolis of far-western Canada, and the largest city in British Columbia, is situated in the southwestern corner of the Dominion, on the southern shores of English Bay and Burrard Inlet, which are connected by a narrow strait, and together form an arm of the Gulf of Georgia—the large body of water that lies between the Pacific Ocean and Vancouver Island on the one side, and the mainland, upon which is the city, on the other. Approximately 2½ miles to the south of Vancouver is the northern shore of the delta-like mouth of the Fraser River, while to the north of English Bay and Burrard Inlet are the high mountains of the Cascade Range.

The city consists of three geographically distinct divisions, due to the penetration of False Creek, an arm of English Bay, about midway between the shore on the north and the city limits on the south and extending back toward the eastern limits for almost two-thirds of the city's length. The section between False Creek and the waters on the north is devoted to business, and it is here that the concentration of street railway traffic occurs, while the sections to the south and east of the creek are of a residential or suburban character.

Vancouver's growth has been remarkable when it is considered that it is a comparatively new city, having been entirely rebuilt in 1886, after the disastrous fire of that year, which destroyed all but one building. Its original settlement was due principally to the early "gold rush" to Alaska, and from a population of between 10,000 and 20,000 at that time, it

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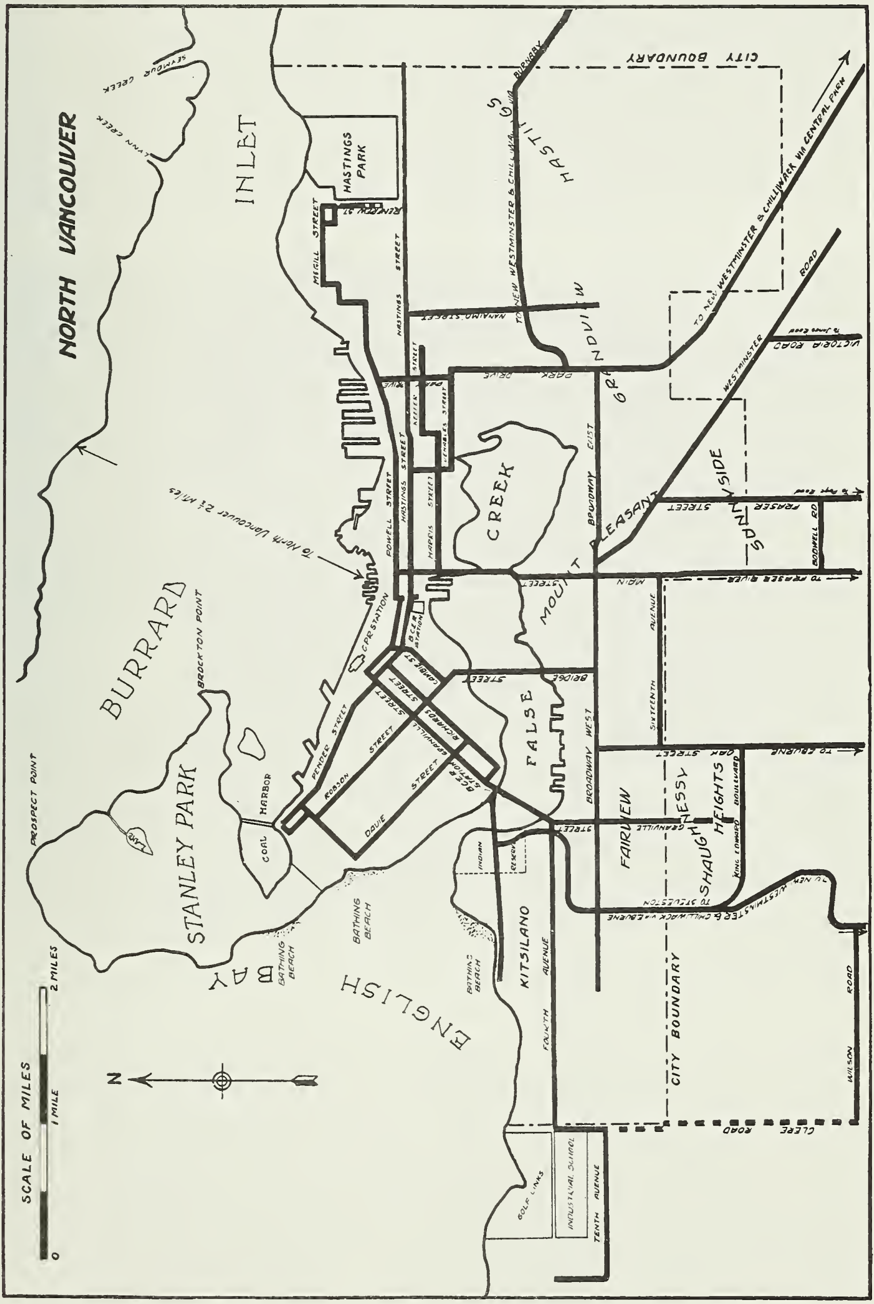
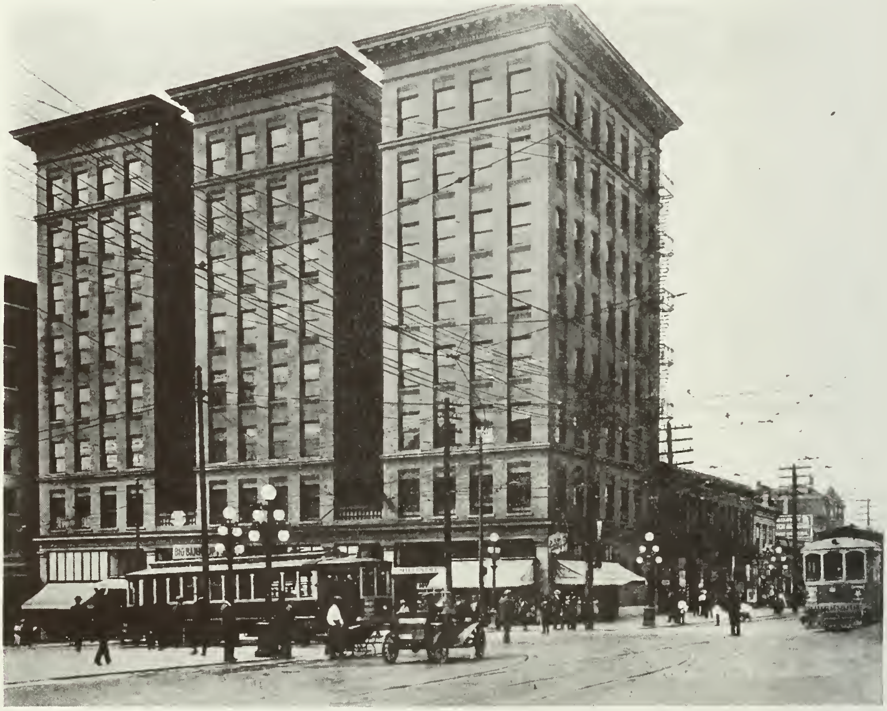
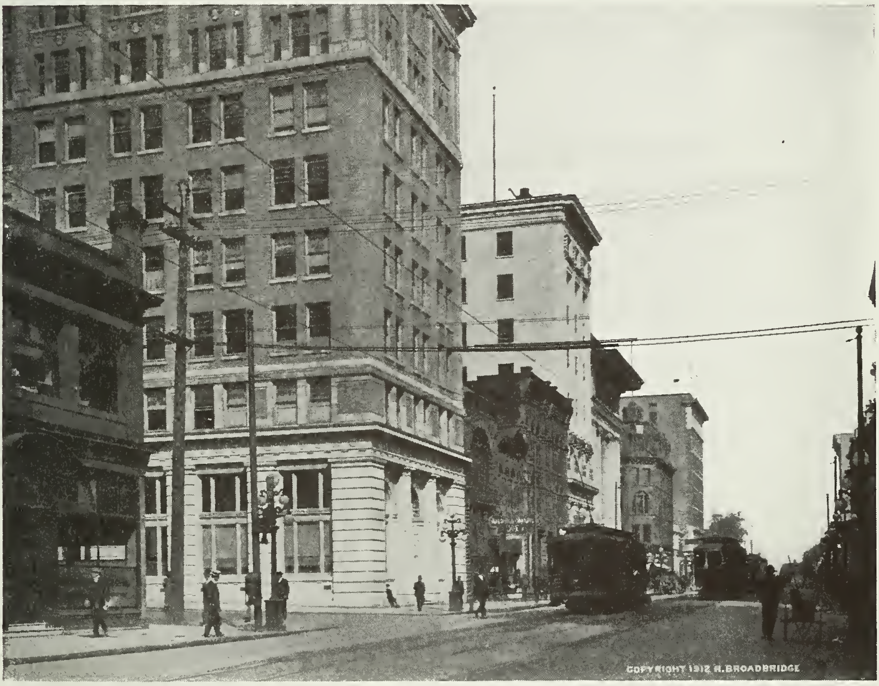
* The forty-eighth article of this series.



VANCOUVER TRAFFIC CONDITIONS AND CARS. Business section occupies peninsula north of False Creek. All car lines, where possible, are through-routed between extreme western and eastern or southern points, passing through business section. Some suburban cars run to business section only has increased steadily, until at the last census (1911) there were 101,000 inhabitants. It owes this phenomenal growth almost entirely to its geographical position, for English Bay and Burrard Inlet are among the finest natural harbors in the world and make it a logical seaport for the Far East, and the fact that it is the nearest seaport to the great northwestern grain regions and the immense northern timber tracts is a contributing factor in its attainment of commercial supremacy on the Canadian Pacific coast. The greater part of the city's business is of a commercial nature. Trading with northern and eastern points in British Columbia and Alaska is an important phase of Vancouver's commercial life, and being the western terminal of the Canadian Pacific Railway and the



VANCOUVER TRAFFIC CONDITIONS AND CARS. Main and Hastings Streets, where cars from south and east enter business section. One of chief points in through-routing system starting point of transpacific steamship lines for Japan, China, Australia and New Zealand, brings it into close contact with the Orient. Manufacturing is carried on extensively, and includes the products of sugar refining, cooperage, shingle manufacture, sawmilling and kindred industries, that result from its being the center of large timber interests.



VANCOUVER TRAFFIC CONDITIONS AND CARS. Hastings Street near Granville, two most important business streets in city and through which bulk of street railway traffic passes. During rush hours, from 6 to 9 A. M. and 4.30 to 7.30 P. M., headway of cars on Hastings Street is 45 seconds and on Granville Street, 40 seconds

The important streets in the business district are 80 ft. wide, and while there are a few as wide as 99 ft., the general width is 66 ft., and this is the width of the principal streets used by the electric cars. As far as possible the street plan is rectangular, with the streets running north and south and east and west, but owing to a turn of the peninsula toward the northwest, the streets in that portion assume this direction. All streets in the business section are well paved, and those in the three residential sections are being paved as rapidly as conditions permit.

The entire street railway system of Vancouver is operated by the British Columbia Electric Railway Company, Limited, which also operates the street railways in Victoria, North Vancouver and New Westminster, in addition to several important interurban lines. A large new interurban terminal station and office building at Hastings and Carral Streets, in the center of the business portion, is the headquarters of the company.

Owing to the street plan in the business section and to the location of the two residential districts to the east and southwest, the general layout of the street railway system assumed a

Vancouver Traffic Conditions and Cars. Hastings Street, looking east. Principal business street of city. This and most other streets are 66 ft. wide, although there are some 80 and 99 ft. wide

VANCOUVER TRAFFIC CONDITIONS AND CARS. Granville and Robson Streets. This is a central point of interurban train traffic. Well-paved and clean streets and modern buildings are characteristic of Vancouver

form comparable to two open fans with a common handle in the business section. The street railway operating situation in Vancouver is peculiar, because of the penetration of False Creek. Reference to the map on page 355 shows the concentration of street railway lines in the business district on the northern peninsula. The first car line, in 1889, ran through that section, and with the upbuilding of the residential districts of Fairview and Mount Pleasant on the south, and later Grandview and Hastings on the east, extensions were made through these localities. The lines in the city of Vancouver represent a total of 88.12 miles of track, reduced to single-track basis, of which there are 21.76 miles of single, 31.81 miles of double and 2.74 miles of barn and storage track. Standard gage, 4 ft. 8½ in., is used on all lines, and the radius of the shortest curve is 34 ft. While both long and short gradients are encountered on all lines, and some of these are fairly heavy, the maximum gradient is 8.75 per cent. Energy for the operation of the city and interurban lines is generated in a large hydro-electric plant at Lake Buntzen tion. All streets in the business section are well paved, and those in the three residential sections are being paved as rapidly as conditions permit.

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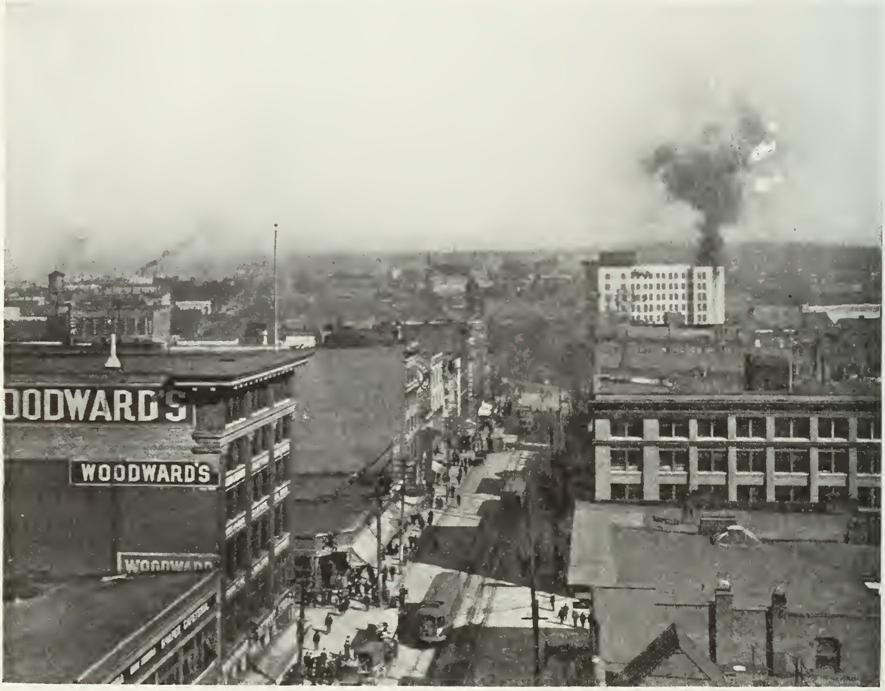
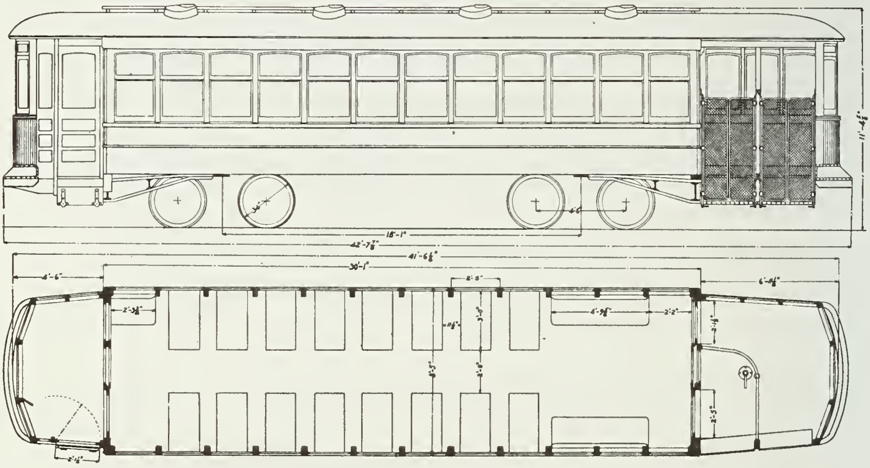


Vancouver Traffic Conditions and Cars. Hastings Street, looking east. Principal business street of city. This and most other streets are 66 ft. wide, although there are some 80 and 99 ft. wide passengers to the city cars at those points. Cars from the residential section south of False Creek enter the business section over one of three bridges, the bulk of traffic being carried by the outer bridges, while the center one serves mainly as a highway for the line from the belt line to the business center.

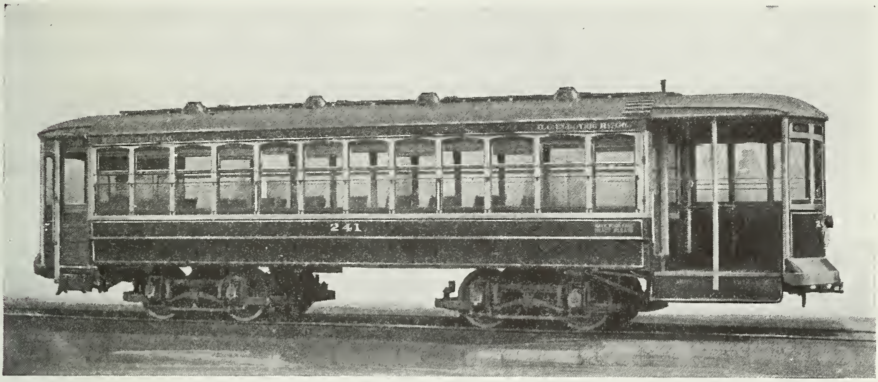
Due to the narrow configuration of the northern peninsula, but two streets are the main arteries of street railway traffic, one of which—Hastings Street, the main business thoroughfare—accommodates all important east and west traffic, while Granville Street—the principal north and south thoroughfare—is used for all heavy traffic in that direction. This concentration of traffic occasions considerable congestion during the hours of heaviest travel—from 6 to 9 A. M. and 4.30 to 7.30 P. M. —when 155 cars are in service, passing east or west, as the case may be, at intervals of 45 seconds, and north or south, where cars from the suburbs also occupy the city lines, at intervals of 40 seconds. Normally 128 cars cover the daily requirements,

Vancouver Traffic Conditions and Cars. Terminal Building of British Columbia Electric Railway, Hastings and Carral Streets, Vancouver. All important east and west traffic passes here. Also used as terminal station for interurban lines and general offices but in addition to those mentioned as being in active service there are fifteen reserve cars, and this total is being added to as rapidly as conditions demand.

During the fiscal year ending June 30, 1911, the car mileage was 5,863,000, with 45,000,000 revenue passengers, or 7.65 passengers per car mile; 7,136,000 transfer passengers were carried. This represents a traffic density of 522,015 revenue passengers per mile during that year for the 88.12 miles of the system. Much of this heavy traffic is undoubtedly due to the liberal scale of rates which is offered. Instead of the customary five-cent flat rate that is usual in many American and Canadian cities the company sells six tickets for 25 cents and twenty-five tickets for $1, that are good, with transfer privilege, at any time. In addition to these, eight tickets are sold for 25 cents, that are good only from 6 to 9 A. M. and 5 to 7 P. M., the peaks of the hours of heaviest travel. School children's tickets, at ten for 25 cents, are also provided. Nearby suburban traffic is encouraged by granting "settlers' rates," which represent a five-cent fare with transfer privileges.

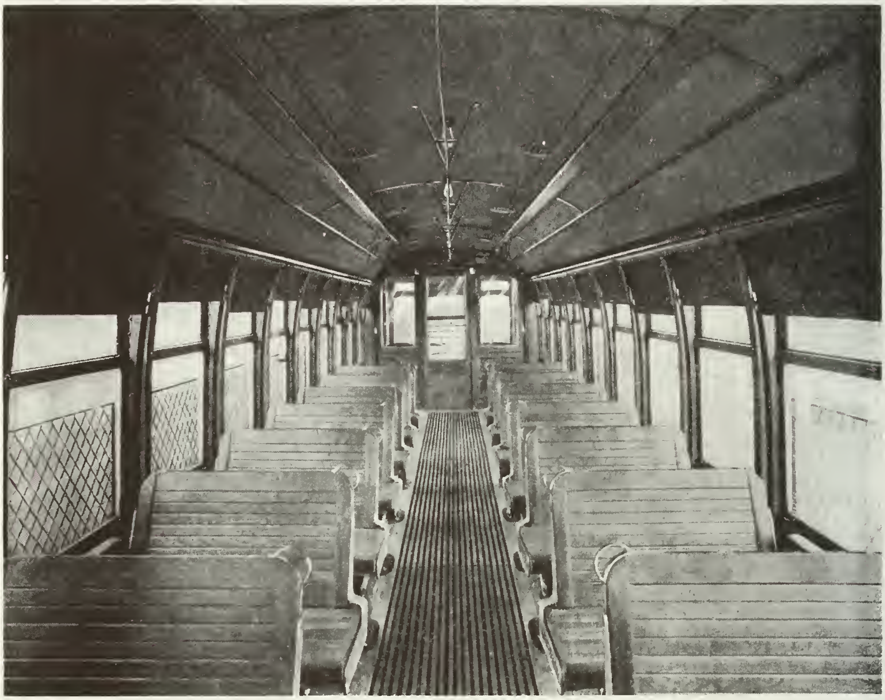


VANCOUVER TRAFFIC CONDITIONS AND CARS. Folding wire-mesh gates on rear platform swing outwardly. Seating capacity for 32 passengers on transverse seats; two rear longitudinal seats, 8; forward longitudinal seat, 2. Folding step and inwardly-swinging door on front platform operated by motorman



Vancouver Traffic Conditions and Cars. Standard Brill single-end semi-convertible prepayment car of British Columbia Electric Railway. Arranged for left-hand operation. Mounted on Brill No. 27-GE1 trucks, standard of system

The prepayment method of fare collection is used in Vancouver, and while a variety of car types, all adapted to the prepayment system, are in operation, the standard type is a double-truck single-end semi-convertible prepayment car built by the J. G. Brill Company. The car is mounted on Brill No. 27-GE1 pivotal trucks with 4 ft. 6 in. wheel base and is built on a wooden bottom frame, in which the sills and crossings are amply reinforced with longitudinal steel plates and transverse trusses to take up any strains imposed by the long rear platform. The platform openings, both front and rear, are on the left side, instead of the right, this method of operation being the standard of the British Columbia Electric Railway Company. The rear platform is divided by a railing for separate entrance and exit, that extends from the bulkhead to a wooden post placed at the center of the step and reaching to the hood. Two pairs of wire-mesh gates are hinged to this post and to the body and vestibule posts. They swing outwardly and are operated by a simple lever system from the conductor's position. The front platform, which is used for exit only, is provided with a folding step and inwardly swinging door, operated in unison by the motorman, through a lever. In the rear bulkhead there is a door on each side, each sliding into a common central pocket; in the front bulkhead there is one sliding door at the left. All sashes in the doors and bulkheads are fitted with wire glass, those in the front being opaqued to prevent reflections confusing to the motorman when the car is lighted at night. The seating plan provides for 42 passengers, of whom eight occupy two longitudinal seats near the rear corners, 42 the transverse seats, which are



VANCOUVER TRAFFIC CONDITIONS AND CARS. Brill Semi-convertible window system. Clear wire-glass in rear bulkhead and doors; opaque wire-glass in front bulkhead and doors, to darken motorman's space at night

of the Brill stationary-back type, and two the single longitudinal seat in the forward right corner. The Brill semi-convertible window system, in which the sashes disappear in roof pockets, makes the car equally satisfactory for winter and summer service.

The J. G. Brill Company recently furnished the British Columbia Electric Railway a "Stepless" car and a "Nearside" car. These cars are described in the following article.

"NEARSIDE" AND "STEPLESS" CARS FOR VANCOUVER, B. C.

THE British Columbia Electric Railway Company, which operates the street and interurban electric railways in Vancouver and New Westminster, and Victoria and Vancouver Island, B. C., recently purchased a "Stepless" car, similar to the New York car, and a "Nearside" car, similar to those operated by the Philadelphia Rapid Transit Company, from The J. G. Brill Company, for experimental purposes.

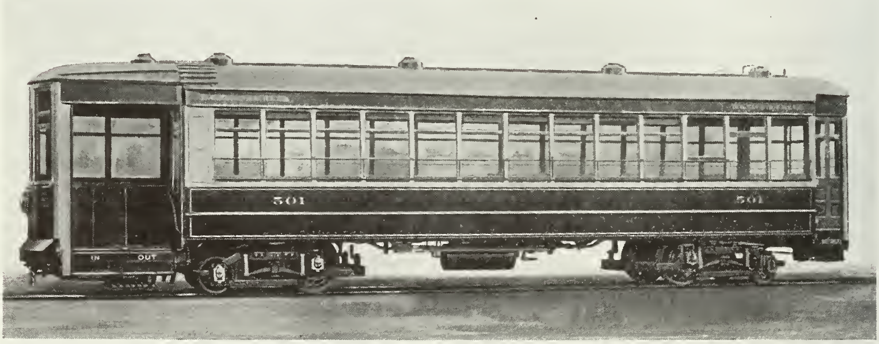
While double- and single-end prepayment cars are the standard cars on the city lines of the company, the new types were bought to ascertain their relative merits as to their adaptability to Vancouver conditions.

The "Nearside" car is in every way a counterpart of those that have been adopted as standard by the Philadelphia Rapid Transit Company, detailed descriptions of which were published in BRILL MAGAZINE for June, 1911, and May, 1912. It differs only in that it is arranged for left- instead of right-hand operation, this being standard on the British Columbia Electric Railway.

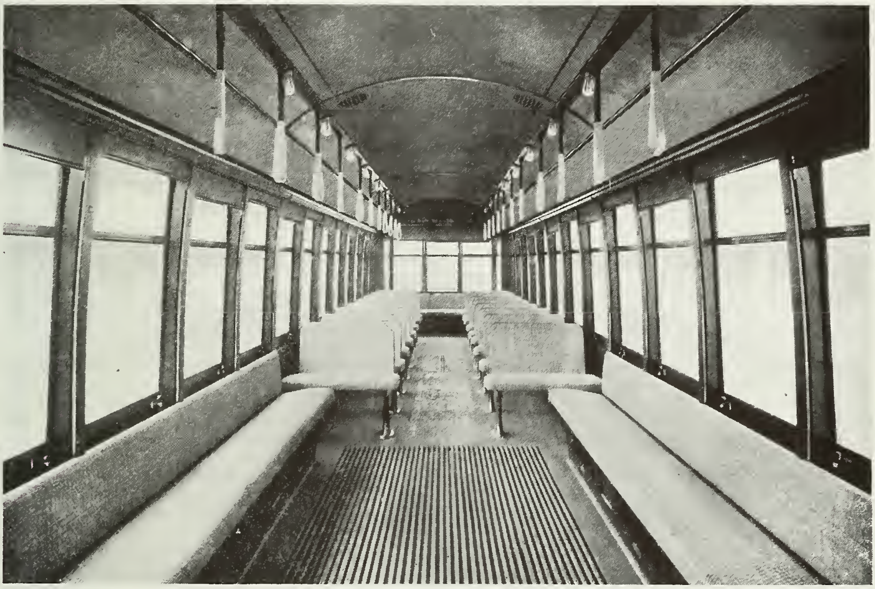
The bottom frame, which is built entirely of steel, has side sills of 5/16-in. plate, 18 in. at the widest part, reinforced at top and bottom and vertically, at intervals, by light angles. At the forward end, upper trusses assist the knees in supporting the long platform. There are eight crossings made of light angles, forming powerful latticed trusses. The body bolsters are cast steel and are each designed to carry 21,000 lb. at the center plate. The side posts, which are of ash, are tenoned into a yellow pine sill that is bolted to the lower angle on the sill plate. They are further secured by strap bolts that extend through the pine sill and angle, and by bolts through the vertical angles that are riveted to the sill plate. The wooden concave and convex side panels are sheathed with four sections of cold rolled sheet steel, and at the bottom is a 2 by 3/16-in. steel molding beveled on its top edge. Ash carlines, reinforced with steel, support the Brill plain arch roof.

The window system is the Brill semi-convertible type, in which the sashes disappear in roof pockets. The absence of a rear platform greatly increases the seating capacity over the usual type of car, there being seats for 54 passengers, of whom 5 occupy a circular seat at the rear, the transverse seats, 32, the longitudinal seats at the left, 7, and those on the right side, 10. A greater width of both aisle and seat is obtained in the use of Brill stationary-back transverse seats, having pressed steel pedestals with extensions to support the backs. From the forward bolster to the front platform the car floor slopes downwardly 1½ in., thereby reducing the step elevation. The interior woodwork is of cherry, all fittings of solid bronze, and the headlining of composition board. Stationary hand straps and signal push buttons are provided. The car is mounted on standard Brill No. 39-E single-motor trucks, like those that have been made standard by the Philadelphia Rapid Transit and Chicago City Railway Companies.

As in other "Nearside" cars that have been built, both the conductor and motorman occupy the front platform. The re-



"NEARSIDE" CAR FOR VANCOUVER. Same as standard in Philadelphia, Buffalo and Chicago, except arranged for left-hand operation. Folding doors and steps at platform operated by the motorman. Emergency exit at rear operated by the conductor. Brill No. 39-E single-motor trucks



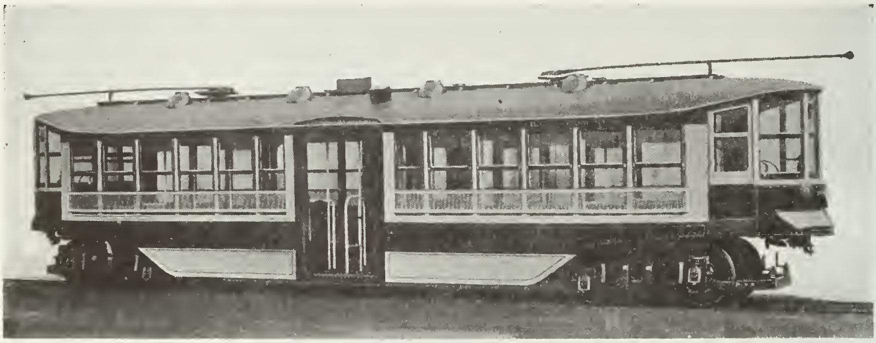
"Nearside" Car for Vancouver. Seating capacity, 54; circular seat in rear, 5; transverse seats, 32; longitudinal seat at left, 10; longitudinal seat at right, 7. Brill semi-convertible window system

sponsibility is definitely divided between the motorman and conductor. Opening and closing of doors and stopping and starting are entirely in charge of the former, while fare collection, issuing of transfers and announcing of streets are practically the sole duties of the latter, increasing crew efficiency and safe and prompt operation.

The principal dimensions of the "Nearside" car follow:

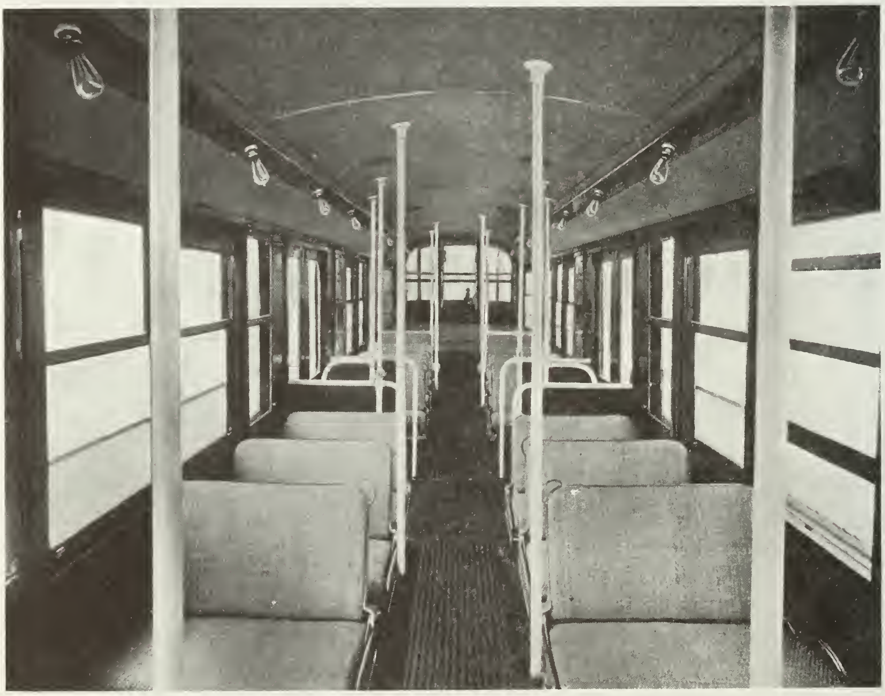
Length over corner posts	34 ft. 1⅜ in.
Length over platforms	45 ft. 1 in.
Length of platform	7 ft. 6 in.
Centers of side posts	2 ft. 6 in.
Width over posts	8 ft. 5 in.
Extreme width	8 ft. 6 in.
From track to side sills	2 ft. 6¾ in.
From side sills over trolley boards	9 ft. 0½ in.
From floor to center of head-lining	7 ft. $11\frac{11}{16}$ in.
From track to step	$13\frac{15}{16}$ in.
Step to platform	13 in.
Platform to floor	10½ in.
Seating capacity	54
Type of trucks	Brill No. 39-E
Wheel base	4 ft. 10 in.
Diameter of wheels	33 in. and 22 in.
Weight of carbody less electrical equipment	18,180 lb.
Weight of trucks	10,040 lb.
Total weight less electrical equipment	28,220 lb.

The "Stepless" car is all-steel, with the exception of a few minor parts, not subject to strain, and some of the interior

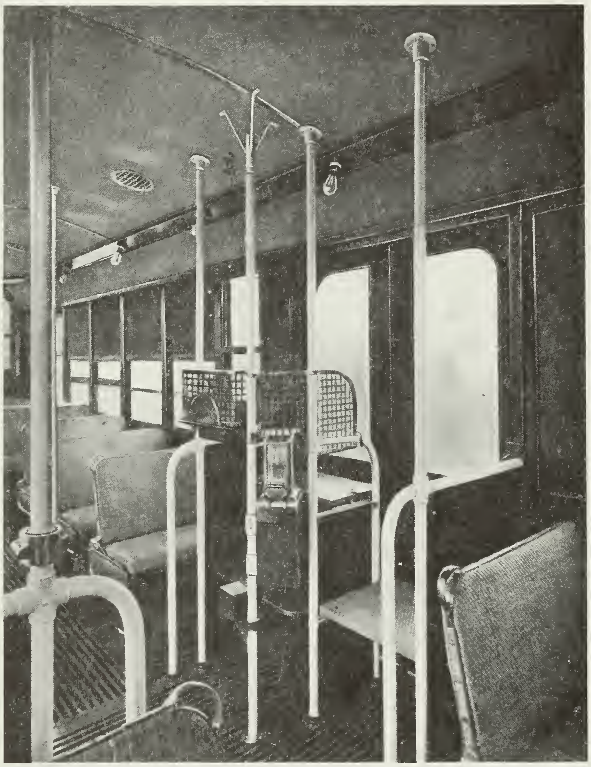


"STEPLESS" CAR FOR VANCOUVER. Car is all steel. Floor at step, 11½ in. above rail. Double sliding doors, pneumatically controlled by the conductor; act as line switch and break circuit when open. Brill No. 62-E special trucks

fittings, and in appearance resembles its New York prototype. The steel bottom frame is built of two 3 by 3 by 5/16-in. angles which are depressed for the low-level floor between

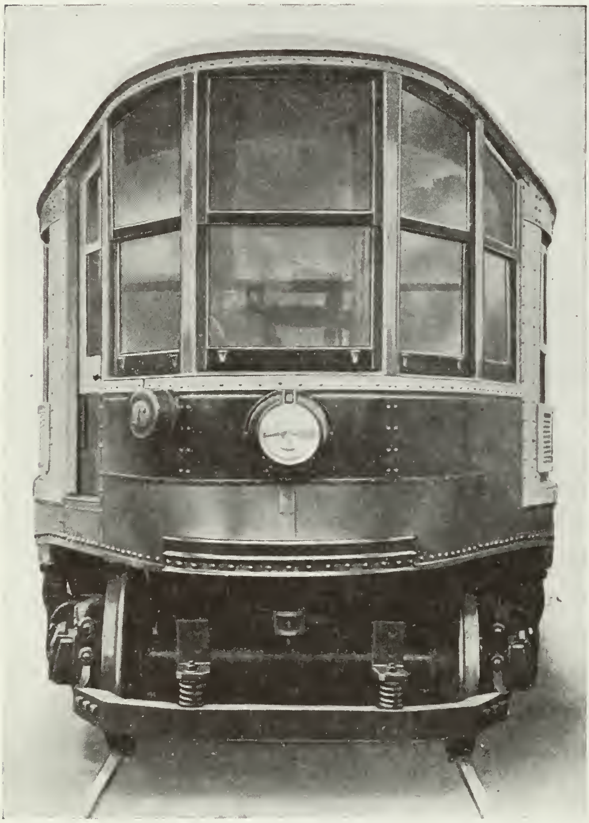


"STEPLESS" CAR FOR VANCOUVER. Cross seats accommodate 32; two circular seats at ends, 18; folding seat at door, 1; total, 51. White enamel pipe stanchions supplement grab handles on seat backs. Lower sash of windows raise full height; upper stationary



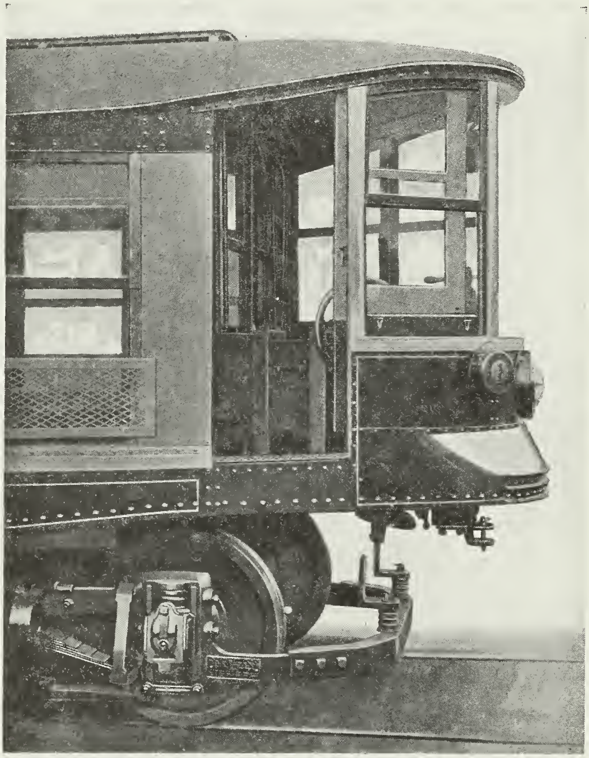
"STEPLESS" CAR FOR VANCOUVER. Movable conductor's desk, with fare-box and register, and folding seat for one passenger opposite entrance-exit. Doors controlled by foot-actuated air mechanism on stanchion holding fare-box. The conductor's seat is high, to afford view over passengers' heads

the trucks and converge slightly just ahead of each driver axle, where they are spliced to continuous angles of the same size, which are bent around the ends to form the bumpers and anti-climber supports. Directly under each door-opening, and extending slightly beyond, on both sides, an angle is set into the side sill, for reinforcement at that point, actually forming a built-up channel. There are nine crossings in the low level of the bottom frame, each consisting of 3-in. channels, of 4-lb. section, placed back to back. The body bolsters are attached at the points where the side sills reach the high level over the trucks, and are built-up of 3½ by 6 by 3½ by ⅜-in. Z-bars, depressed between the wheels in order to preserve the low floor and retain the seat-cushions at about the same height throughout the carbody proper. The stringers consist of 3 by 2 by ¼-in. angles, riveted to the crossings in sections. The outermost crossing on each end is connected to the body bolsters by two horizontal 4 by ¾-in. flat bars. Two 3-in. Z-bars are riveted to the depression in the body bolster and, diverging slightly, run through to the bumper. These Z-bars are bent upwardly at about 45 degrees near the driver axle, and then continue in the same plane as the side sills, forming the floor framing of the motorman's cab.


"STEPLESS" CAR FOR VANCOUVER. Ends of round-angle bumper spliced to bottom frame side sills. Sashes in vestibules arranged to drop. The motorman has unobstructed view to side and front

The side and roof construction is rather novel, in the use of No. 18 steel box posts, with brass corrugations for sash and curtain fixtures, and pressed-steel door frames, each consisting of two pressed steel sections, set against each other to form a continuous box around the top and sides of the openings.

The side posts and door frames are set in the side sills and riveted to them through angle reinforcements. Continuous pressed-steel top rails run from each side of the door frame to the corner posts, and are riveted to the outer sides and tops of these and the side posts, as well as to the foot flanges of the steel carlines. The carlines are cut from steel plates and are reinforced at the top and bottom with angles. Large holes, which in no way affect the strength, are cut into the plates, to accommodate the long pipes which are used for air storage purposes instead of the customary drum. Narrow poplar boards drawn over with cotton duck form the roof covering. Pressed steel belt rails, of box section, extend from the door frames to the corner posts and the upper framing along the sides and around the ends is covered with steel sheathing, making the superstructure an extremely stiff girder, in which the pressed-steel door frames, by virtue of their own form, and their connection to the longitudinal members, distribute the load between the car-ends and neutralize the breaking strains in the components of the structure.



"Stepless" Car for Vancouver. In addition to the usual electrical equipment, the air compressor is installed in cab with pipes to air storage pipes in roof

The interior finish is entirely of metal, except the floor, which is laid with the usual yellow pine boards and maple mat strips, the headlining, which is composition board, and the double window sashes, which are wood, lined with brass stiles. The upper sashes remain stationary and the lower are made to raise. The seating plan provides for 51 passengers. In each half of the car are six reversible cross-seats, and two cross-seats with stationary-backs and a circular seat for nine persons between the stationary-back seats and the bulkhead. There is an additional folding seat for one passenger extending the width of one-half the entrance on the side that is not in use, the other half being occupied by the conductor's seat and change desk, from which all his duties may be performed. In lieu of hand straps, white enameled pipe stanchions supplement the grab handles on the seat backs, and push buttons are provided to signal the motorman. The bulkheads, in which there are three double drop sashes, are the vertical extensions of plate girders that act as crossings in the bottom framing. The motorman's cabs contain the air compressor as well as the usual electrical equipment. In addition to a sliding door on the right side, with stationary sashes, there are four double-sash windows, the lower arranged to raise. In this type of car the motorman's seat is considerably higher than in usual cars and gives him the advantage of a good view ahead and to each side. The car is mounted on specially designed Brill No. 62-E single-motor trucks, in which the bolster is carried sufficiently low to accommodate the low floor over the trucks.

The principal dimensions of the "Stepless" car follow:

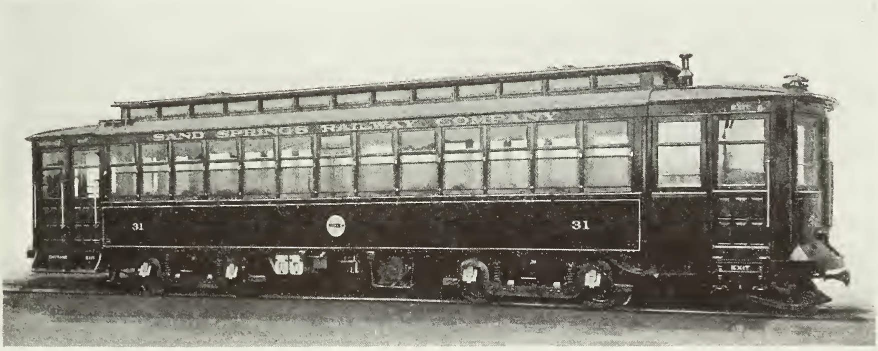
Length over all	44 ft. 0 in.	Track to floor	11½ in.
Length over vestibules	43 ft. 0 in.	Seating capacity	51
Length of front platform	4 ft. 4 in.	Type of trucks	Brill Special No. 62-E
Length of rear platform	4 ft. 4 in.	Wheel base	5 ft. 0 in.
Centers of side posts	2 ft. 5⅛ in.	Diameter of wheels	33 in. and 21 in.
Width over sills	8 ft. 1½ in.	Size of journal	3¾ x 7 in.
Width over posts	8 ft. 1⅝ in.	Type of motors	GE57—2-50 hp.
Extreme width	8 ft. 3 in.	Weight of carbody less elec. equipment	17,500 lb.
From track to side sills	9½ in.	Weight of elec. equipment	1,000 lb.
From side sills over trolley boards	9 ft. 0⅛ in.	Wt. of air-brake equipment	1,400 lb.
From floor to center of headlining	8 ft. 0 in.	Weight of trucks	9,640 lb.
		Weight of motors	5,944 lb.

INTERURBAN CARS FOR SAND SPRINGS RAILWAY COMPANY, OKLA.

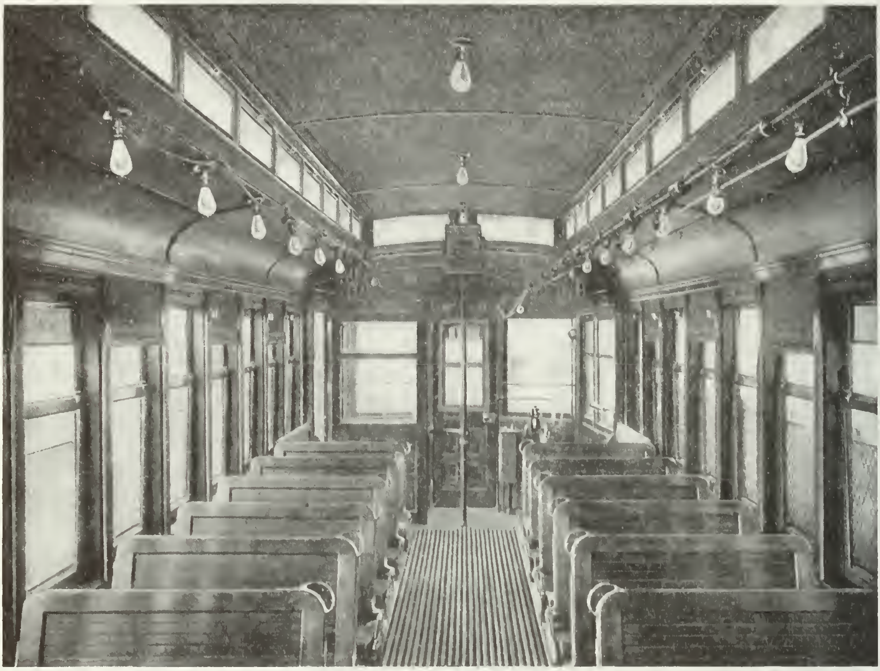
PREPAYMENT TYPE

THE American Car Company lately furnished two interurban cars, arranged for the prepayment method of fare collection, to the Sand Springs Railway Company for operation on an 8-mile line, between Tulsa, Okla., and Sand Springs. The prepayment system will be used later, should traffic warrant.

While the general appearance of the carbodies would suggest city service, the construction is distinctly interurban, and this is particularly noticeable in the bottom frames. The loads carried are comparatively heavy, acceleration rapid, and speeds relatively high for the conditions, and trailer operation necessitates staunch construction. The side sills consist of 7¾ by $4\frac{5}{32}$-in. yellow pine, bolted to ⅜ by 18-in. steel sill plates that are reinforced with angles along the top and the lower edges. There are two 6-in. I-beam stringers, with yellow pine fillers, and malleable iron spacers are placed between the fillers on the insides of the I-beams, while 3½ by $6\frac{3}{16}$-in. white oak crossings are placed between the fillers on the out-



CARS FOR SAND SPRINGS. Composite bottom frame reinforced by upper trusses and amply strong for the long prepayment platforms. Cars used in interurban service frequently with trailers; prepayment system not used at present



CARS FOR SAND SPRINGS. Pipe stanchions replace bulkheads. Train doors in vestibules. Lower window sashes raise; upper stationary. Transverse seats accommodate 36; longitudinal seats in corner, 16

sides and the side sills. The double plate type body bolsters, lipped under the side sills at the ends, and the end sills are 5 by 7¾-in. yellow pine, reinforced by a ⅜ by 8-in. steel plate. Further means for stiffening the bottom framing in all directions are provided in diagonal braces inserted between the side sills and the stringers, and upper trusses of 2½ by ½-in. steel, which are anchored under the side sills near their ends.

To give the sides as much stiffness, relatively, as the bottom frame, yellow pine diagonal braces are inserted between the side and corner posts, and the arm and top rails are each in one piece. The posts are tenoned into the latter, and, in addition, bolted to the upper trusses. Both the inside and outside of the side framing are sheathed with $^3/_{32}$-in. steel plate, in sections. The long prepayment platforms are hung from the bottom framing on knees consisting of Z-bars with oak filler.

The car floor consists of two layers of narrow yellow pine boards, with building paper between. The windows in the body, which are of the straight-top variety, have double sash, the upper stationary and the lower arranged to drop; those in the vestibules have single sashes, which drop also, and the monitor roof is arranged with ventilator sashes swinging inwardly on pivots. There are nine reversible Brill "Winner" seats, with wooden slat backs and cushions, on each side of the car, and in each corner there is a wooden longitudinal seat, extending the space of two windows; this arrangement giving seats for 52 passengers. At the right side of each platform is a single sliding door operated by the motorman in conjunction with a folding step, for exit only, while on the other side are two single-leaf folding doors, hinged to a common post and operated by the conductor. In lieu of bulkheads, a pipe stanchion divides the platform at the carbody, while the balance of the arrangement is that customary in prepayment cars. A train-door is placed in each vestibule, as these cars are frequently operated with trailers.

Length over corner posts	33 ft. 9 in.	Step to platform	15 in.
Length over platforms	48 ft. 8 in.	Platform to floor	10 in.
Length of platforms	7 ft. 5½ in.	Seating capacity	52
Centers of side posts	2 ft. 6 in.	Weight of carbody, less electrical equipment	21,000 lb.
Width over sides	9 ft. $1\frac{15}{16}$ in.	Wt. of electrical equipment, including motors (approx.)	12,000 lb.
From track to side sills	2 ft. $9\frac{3}{16}$ in.	Wt. of air-brake equipment	1,900 lb.
From floor to center of headlining	8 ft. 5¾ in.		
Track to step	$16\frac{3}{16}$ in.		

NOVEL ONE-MAN CARS FOR WAYCROSS, GA.

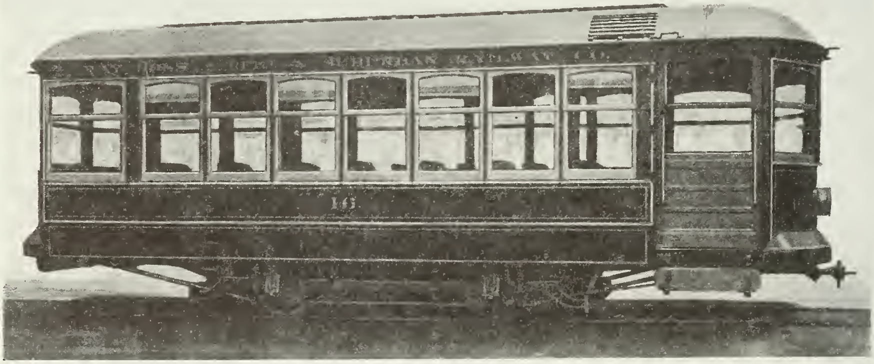
BRILL PLAIN ARCH ROOF

FOUR double-end, single-truck cars, for one-man operation, recently delivered to the Waycross Street & Suburban Railway Company, Waycross, Georgia, by the American Car Company, present a very interesting adaptation of the principle of one-man operation and, according to reports from the railway company, are working very satisfactorily.

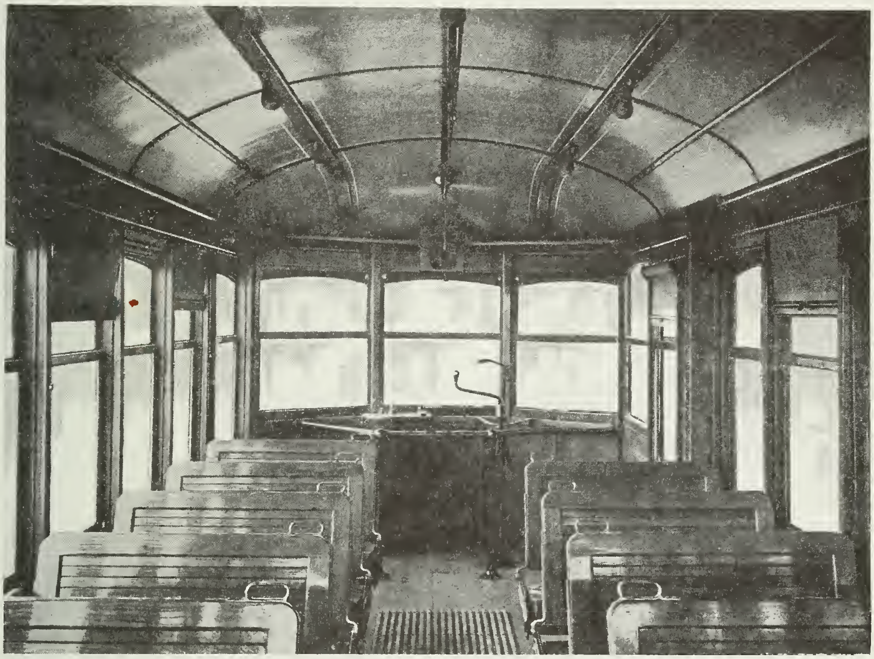
The cars have but two doors, and these are placed at diagonally opposite corners, as shown in the accompanying illustration, and while in the same relative positions as usual in single-truck cars, they open directly into the carbody, there being no platforms and no bulkheads. The motorman is in the same position as in other cars, and, in addition to his usual duties, must act as conductor. He controls a sliding door and folding step, which work in unison, and also operates a fare-box, placed behind him. The forward door, only, is used, as the case may be, the other being locked; therefore causing every passenger to pass the motorman-conductor in boarding and alighting.

The bottom frame consists of 3½ by 7¾-in. yellow pine side sills, reinforced with ⅜ by 12-in. steel plate on their inner sides and 2½ by 4¹/₁₆-in. white oak end sills and cross joists; diagonal bracing of 3 by 1⅛-in. white oak, between the crown piece and the end sill, and between this and the first crossing and, in addition, two pull-knees on each end that extend from the end sill to the Brill angle iron bumper.

The upper framing is composed of 1½-in. ash side, and



CARS FOR WAYCROSS. Two sliding doors with folding steps at diagonally opposite corners; rear door locked. Upper sashes stationary; set in single frame on each side; lower sashes raise full height. Brill No. 21-E trucks



Cars for Waycross. Brill "Winner" cross seats accommodate 24 passengers; two longitudinal seats at diagonally opposite corners, 4; total, 28. Space for additional seat opposite each door opening

1½-in. ash corner and vestibule posts, secured to the bottom-frame in the usual manner. The fact that all longitudinal body-frame members extend from corner post to corner post permitted a considerable reduction in the weight of the posts; for with continuous top and bottom rails at the upper sashes they are given as much stiffness as they would ordinarily have with nearly twice their thickness. The omission of drop platforms also reduces the weight considerably. The side construction is reinforced by concealed truss rods under the arm rails and securely anchored under the side sills and by truss pipes extending from the spring post tie bars of the truck. The Brill plain arch roof is supported on composite carlines.

The simple seating arrangement comprises 12 cross seats of the Brill "Winner" type and two similar longitudinal seats for two passengers each at diagonally opposite corners, affording seating capacity for 28 persons. The seats are made of birch slats and stained in comformity with other woodwork in the body, and each rests on two pressed steel pedestals. The side windows are of the arch top variety with double sash, the upper being stationary, while the lower is made to raise its full height. Because of the continuous side framing, mentioned before, the stationary upper sashes are set in one frame that extends the full length of the car. The vestibule windows are also of the double-sash type, but the lower sashes are stationary, while the upper drop. Cherry is used for the interior woodwork and is stained mahogany color; push buttons, window sill arm rests and hand straps are among the accessories provided in the equipment.

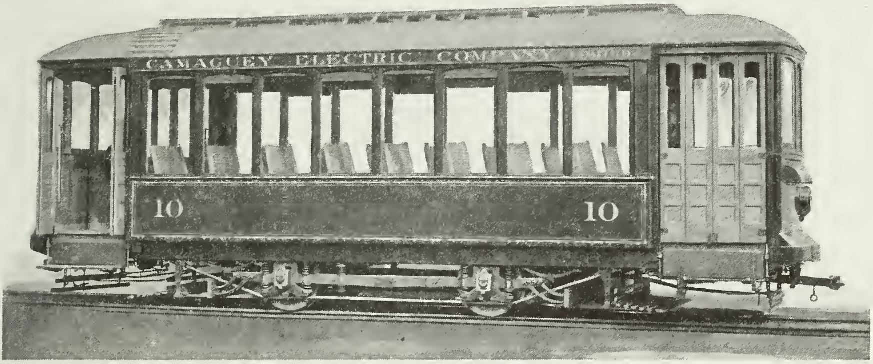
Length over corner posts	18 ft. 0 in.	Step to platform	13½ in.
Length over platforms	29 ft. 0 in.	Seating capacity	28
Length of front platform	5 ft. 0 in.	Type of truck	Brill No 21-E
Length of rear platform	5 ft. 0 in.	Wheel base	7 ft. 6 in.
Centers of side posts	2 ft. 5 in.	Diameter of wheels	30 in.
Width over sills	8 ft. 0 in.	Type of motors	GE-54—2
Width over posts	8 ft. 2 in.	Weight of carbody less electrical equipment	7,500 lb.
From track to side sills	1 ft. 11 in.	Wt. of electrical equipment	2,226 lb.
From floor to center of headlining	7 ft. 11¼ in.	Wt. of truck	5,500 lb.
Track to step	16½ in.		

SEMI-CLOSED PAY-WITHIN CARS FOR CAMAGUEY, CUBA

BRILL No. 21-E TRUCKS

FOUR cars of the type illustrated were delivered recently to the Camaguey Electric Company, Limited, of Camaguey, Cuba, by The J. G. Brill Company, and are now in operation.

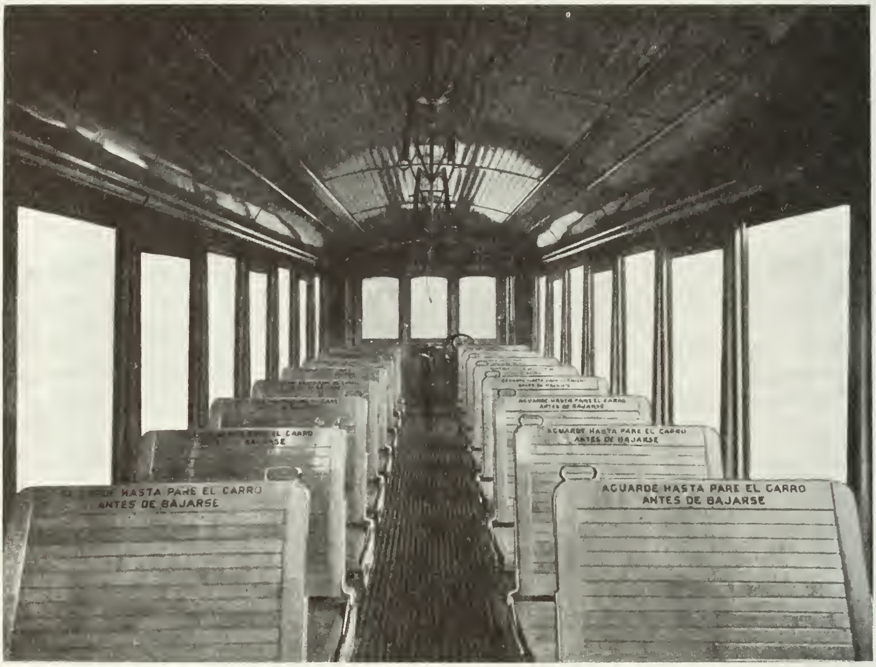
The city of Camaguey lies on a plain about midway between the coasts, 550 ft. above sea level, and has a population of 30,000. It is served by about five miles of street railway, the main line running directly through the town from north to south, with branches extending west to the cemetery and east to the suburb of La Zambrana. The regular service is maintained by six cars, four on the main line, giving a 7-minute service, and one on each of the branch lines, giving a 14-minute service, but the entire equipment of the company consists of eight open cars and the four pay-withins just delivered. The maximum grade on the lines is 2%, 300 ft. long, and the radius of shortest curve 35 ft.



CARS FOR CAMAGUEY. Creosoted wood bottom frame to resist ravages of insects. Curtains in 1½-in. grooves instead of sashes. Brill No. 21-E trucks

The new cars, which introduced the prepayment method of fare collection in this city, are giving excellent results, especially during the exceptionally heavy rains which are experienced in this section, when it is almost an impossibility to keep the open cars dry. The side windows are not provided with sashes, but with curtains set into grooves 1½ in. deep, which give protection against the rain and wind. The wooden underframes are specially treated with creosote and carbolineum for preservation against the inroads of destructive insects. The side sills are 4¾ by 5⅜ in.; end sills, 3½ by 6⅝ in.; crossings, 3½ by 4¾ in.; all of long-leaf yellow pine. The side sills extend from bumper to bumper, the platforms being flush with the car floor. The upper structure is framed with straight-grained ash corner posts, 3⅝ in. thick, and side posts of the same, 2¼ in. thick. The side sheathing is of 3/32-in. sheet steel, reinforced at the bottom with an angle.

The flush platform at each end, 4 ft. 8 in. long, is equipped with round-end stationary vestibule, with three windows, the center one arranged to be held at various heights and the two outer ones to drop. The step openings are equipped with two doors of the double-folding type, manually operated by a lever on the platform in conjunction with a single-folding step. The seats are of the Brill "Winner" slat type, with reversible backs. Eight transverse seats on each side of the aisle provide seating space for 32 passengers. The interiors are finished in cherry and ceilings in carline with roof boards showing.



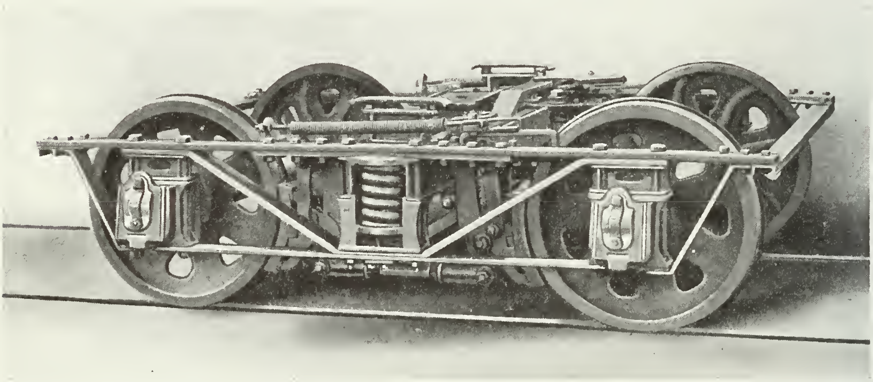
CARS FOR CAMAGUEY. Eight transverse seats on each side for 32 passengers. Platforms arranged for prepayment operation

Length over corner posts	20 ft. 8 in.	Type of trucks	Brill No. 21-E
Length over platforms	30 ft. 0 in.	Wheel base	8 ft. 0 in.
Length of platform	4 ft. 8 in.	Diameter of wheels	30 in.
Centers of side posts	2 ft. 5 in.	Size of journal	3¾ in. by 7 in.
Width over sides	8 ft. 0 in.	Type of motors	West.92A—2-35 hp.
From track to side sills	2 ft. 6⅝ in.	Weight of carbody less electrical equipment	12,700 lb.
From rail over trolley boards	11 ft. 6 in.	Weight of electrical equip't	1,100 lb.
Track to step	18½ in.	Weight of trucks	5,800 lb.
Step to floor	15½ in.	Weight of motors	4,530 lb.
Seating capacity	32		

TRUCK FOR HIGH-SPEED EXPRESS AND FREIGHT SERVICE—BRILL No. 50-E

THE diamond arch-bar type of M. C. B. truck has proved itself, during the many years of its extensive use in both slow and fast freight service on steam railroads, so successful and reliable, that the similar Brill No. 50-E truck was designed to assume the same vital position in electric interurban freight and express service and also under moderately powerful electric locomotives.

The truck consists of two truss-form side frames, the ends of each being tied across by end frames to reinforce the transoms in retaining squareness. Squareness is further preserved in the use of a spring plank, that is bolted to the lowest point of the truss tension members in the sizes for heavier service, no spring plank being used in the lighter trucks. Each side-frame end rests indirectly on the tops of the journal boxes, the under sides of which are held to the horizontal by a tie bar that connects them and that is secured to the lower face of the tension member of the truss near its center. The tie bar is reinforced by a pedestal brace that extends from the bottom of the journal box to the nearer side-frame corner. The position of the transoms, and their resistance to tortion, in the truck, is maintained by the use of unusually large and stiff gusset plates, bolted to the transoms and the side-frame compression members. The weight of the carbody is transferred to the wheels through a non-swinging bolster, having the usual center plate and side bearings. Double spiral springs are seated in a casting, the extended sides of which, together with the imposed transom ends, form the arch bar columns or bolster guides, through which two continuous bolts run. Spring cap castings are fitted to the ends of the bolster, which is built up of two fishbelly channels with their webs in a vertical plane. The large diameter double coil springs, that are placed between the spring seat and spring cap, cushion any side sway occasioned by the slight play allowed for lateral bolster movement in the transom guides, which are placed on the longitudinal truck center line. In order to allow greater clearance for the tie bar over the roadbed, and also to make the supports for the motors and brake hangers as direct and free from complication as possible, a frame seat casting is interposed between the top of the journal box and the end of the inverted arch bar, or tension member. The gusset plates that were mentioned as reinforcing the transoms perform the additional work of supporting the spring-balanced motor suspension bar and the lugs to which the Brill Half-Ball brake hangers are attached. The use of these hangers with a radius bar, eliminates brake beams, and their accompanying troubles and limited clearance, and keeps the shoes constantly in line with the wheel faces.



Brill No. 50-E Truck. Arch-bar principle with rigid bolster; end frames preserve squareness; filler blocks over journal boxes increase length of coil springs, add to clearance over rail and raise motors to proper height. Brill half-ball brake hangers

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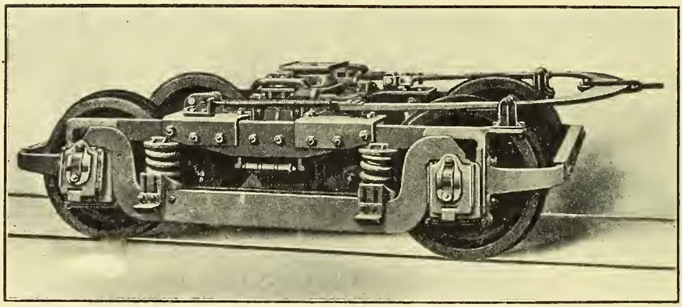

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BRILL No. 27-M.C.B. TRUCK

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